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References: 1. Gershenfeld, L., Am. Jl. Pharm.: 126:112, 1954.

2. Yarlett, M. A., Gershenfeld, L., McClenahan, W. S.: Drug Standards 27:205, 1954.

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MILITARY MEDICINE

(Formerly THE MILITARY SURGEON)

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Editor:

COL. ROBERT E. BITNER,
U. S. Army, Ret.

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MILITARY MEDICINE

ORIGINAL ARTICLES

Authors alone are responsible for opinions expressed in their contributions

The Pharmacist's Role in the Maintenance of National Health*

By

NEWELL STEWART, *Executive Vice-President, National Pharmaceutical Council*

I AM GLAD to have the privilege of addressing the pharmacy section of this meeting of the Association of Military Surgeons as a member of this panel. My subject lends me a topic very close to the present activities of the American Pharmaceutical Association. Two months ago, during the week of October 3rd to 9th (1954), we participated in the annual observance of National Pharmacy Week which carried the message "Your Pharmacist Works for Better Community Health." Pharmacists throughout the country, through the media of newspapers, radio and television, in addition to store by store displays, stressed the activity of the practitioners of pharmacy in the role of community health matters. Success of pharmacies in the communities is based upon two expensive ingredients, both of which would be considered as intangibles—convenience and service. One of the first requirements of a new community is a pharmacy and the public is prone to subsidize that which they believe is necessary. The need for having readily available the necessary requisites for maintaining the health of the community is recognized by everyone and the availability of that source, together with the type of its operatives, tends to cause the public to insist on many expanded services. The pharmacist

is deeply conscious of the fact that he is entrusted with a professional responsibility to serve, sometimes even at a monetary loss, but at a gain in the goodwill of his neighbors. The pharmacist has no such thing as hours to work when health is at stake. His day, unvarying in its broad outlines, is never the same in detail. It begins so early that in the winter his hurrying figure striding down the main street of the town is still obscured by dawn darkness. Hunched against the cold he turns in at the corner, unlocks the door and steps inside to survey his little empire. Before he closes for the day he will have had people visit him for every reason under the sun. Some may come in during the day just to pass the time with the pharmacist or lead him into a discussion on politics or other subjects of current interest. To these people the pharmacy of today has replaced the general store of yesteryear.

The man who supervises these multitudinous activities is a peculiar blend of scientist, businessman, host and confidant who will be called upon to sell such varied items as hairbrushes, face powder, liver pills, tobacco and sodas, and, at the same time, he will have compounded prescriptions for old time remedies, reposing in dusty corners of his prescription room, as well as the modern miracle preparations that he checked in the day before. He will have cut a piece of adhesive for a blister on a youngster's heel, and rendered first aid to the pedestrian who has been

*Presented at the Pharmacy Section panel, 61st Annual Convention of the Association of Military Surgeons of the United States, Hotel Statler, Washington, D.C., November 29-December 1, 1954.

knocked unconscious by a car in front of his store. By the time he is ready to go home for the night his feet possibly hurt and he may even wonder just how he happened to get started in his profession. Yet he wouldn't trade places with the banker, the lawyer, or even the governor if he were forced to discontinue his profession in so doing. Pharmacy has developed into the position it now occupies in our complicated society by meeting the needs of the people who have been attracted to it. In this specialized society of today we demand perfection and through the ages pharmacy has been developing towards deliberate specialization. It has foreseen the needs of the public and, of its own volition, has promoted legislation in every state to require of its practitioners the highest degree of care and skill in handling the health needs of society.

The pharmacist is aware that he is the professional purchasing agent of the doctor as well as his therapeutic consultant. With the pace of progress in research greatly accelerated and with new medications against diseases that enslave mankind being discovered in ever increasing numbers, the pharmacist must keep alert and informed about the new preparations and stand ready, at all times, to fill the needs of the doctor and his patient. Certainly, news in the field of public health is of the utmost significance as it marks the progress being made by scientists in the conquest of disease and, more particularly, in improving the conditions under which we live. It is good to have a well informed public in matters of health, as confidence is generated in all the professions when the veil of mystery and secretiveness are lifted far enough to enable people to break away from the fear complex usually associated with the unknown and particularly associated with unknown sickness and its amelioration.

I was recently privileged to participate in a serious and searching program marking the 125th Anniversary of Columbia University's College of Pharmacy which chose as a theme "Pharmacy and the Conquest of Disease." This program highlighted the serv-

ice pharmacy has rendered the public as a science, as a profession, as an industry and as a trade in the evaluation of its health requirements. The definition of a drug in part states that it is a substance made use of in the cure, mitigation, prevention and treatment of disease and the contributions offered by pharmacy during these past fast-moving decades with the hundreds of newer and more potent additions to our armamentarium have helped to extend the life-span of humans and strengthen their economic effectiveness. These contributions have done much to place the pharmaceutical profession in an enviable position. The new discoveries emanating from the test-tubes of pharmaceutical chemists, pharmacologists, pharmacognosists and other scientists in the many research laboratories, not only of our pharmaceutical plants but also in our colleges, our hospitals and, in many instances, in the retail pharmacy on the corner, are continuing to astound the public and are even astounding those scientists who are closely associated with the discoveries. We are living in a world of change, but with all the scientific and technical progressiveness we have been making, pharmacists have remained the friendly neighbors of the people of our far-flung communities. It is in the role of guardians of the health of the community that pharmacists are able to do their best work and the potentialities for beneficial public service are tremendous. Even though their background and training, as well as the procedures they use in their daily routines, differentiate pharmacists from the other members of the health professions, the basic tenet of improving the health of the American people associate them intimately with their colleagues in medicine, dentistry and nursing.

In each community it is usually the pharmacist who is turned to for advice in promoting pioneer health programs. He is the firm link between the practice of medicine and the general public and frequently is consulted even before the physician. Also, it is he to whom the patient who has not understood the nature and limitations of

good medical care will vent dissatisfaction. In numerous instances it is the pharmacist who will steer him back into safe medical hands when he has been tempted to accept the claims and assurances of quacks or charlatans. This service rendered by the pharmacist is unostentatious and tends to go unrecognized by the public and physicians. A host of other services offered by pharmacists throughout the country have possibly received much wider recognition due to the accompanying publicity. Certainly the pharmacist was called upon to render a distinct aid in the launching of venereal disease programs where their cooperation was required to deal with patients who sought to buy fakes and nostrums for the treatment of syphilis and gonorrhea. The American Pharmaceutical Association has participated actively in cooperation with the U. S. Public Health Service and the American Social Hygiene Association in the education of the public through informative displays in retail pharmacies throughout the country.

This service of health education at the point of greatest public acceptance has continued on a year round basis for the dissemination of information on cancer, heart disease, muscular dystrophy, poliomyelitis, tuberculosis, diabetic detection centers and many other programs. In the United States on January 1, 1954 we had 51,923 retail pharmacies together with about 2,000 hospital pharmacies, with a total of 106,590 registered pharmacists. Their stores were visited by approximately 22 million people every day—over eight billion personal contacts with the American public a year and it has been said that people visit retail pharmacies for one of three reasons—to keep well, to look well and to get well. The opportunity furnished the pharmaceutical profession to disseminate valuable health information to this tremendous cross-section of our population is always available for programs initiated by our colleagues in the health field.

As an individual with professional training in the sciences which are basic to health the pharmacist's friends, neighbors and customers, on the many main streets of Ameri-

ca, look to him for health advice and for community leadership on health matters. It is his word and advice that are most respected and solicited on issues calling for community action or expenditure of funds for furthering forward-looking programs in sanitation, establishing city and county health programs and other matters which require participation of the general public in their enactment.

The pharmacist also has a vital interest in the common field of action where they have been working with health officers for years in a far-flung program of drug control and have actively participated in promoting the enactment of adequate health legislation in our cities, our states and in our nation. In 1848 our Congress passed an Act to prevent the importation of adulterated and spurious drugs and medicines. This law was badly needed, at the time, due to the lack of legislation in our states. During its first ten months of operation almost 100,000 pounds of drug imports were rejected in the New York Custom House alone. The realization of the existing need was recognized by representatives of our then existing five Colleges of Pharmacy who called a meeting in New York to lay the groundwork for the formation of the American Pharmaceutical Association in October, 1851. The need for such an association to direct the then-existing problems confronting the profession was based on the control of adulteration; the ill-consequences of nostrums to the consumer; the indiscriminate sale of poisons and other conditions tending to affect the health of the public.

While the profession of pharmacy was born on European soil as a legally recognized profession of its own when the German Emperor, Frederick II, in 1240 issued an edict for the kingdom of the Two Sicilies separating pharmacy from medicine, the modern period emerged out of the interaction of many forces. Economic, social, technological and intellectual factors reacted very intimately on one another. One of the most important phases in this process of preparation was played by the technological

revolution taking place at that time. The invention of printing made it possible to emancipate practical knowledge from the tradition of secrecy in which it had been veiled and to disseminate information on a much broader scale. However, the progress of pharmacy was exceedingly slow even though a great amount of the groundwork had been laid for its advancement. Pharmacists continued to operate their shops in much the same manner as their forbears for several hundred years. They catered only to the need of the sick of their immediate communities without developing an overall program for expanded service. The quack and medicine man traveling from community to community were rampant, even within the memory of some of you who are assembled here today. The interesting shows arranged by them, followed by the promotion of medicines for every conceivable ill, were patronized by the public in large numbers while the pharmacist was practicing his profession under the guise of mystery and secretiveness in the dark and gloomy recesses of his little shop.

Soon after the formation of the American Pharmaceutical Association, groups met to consider passage of legislation, for the protection of the public in matters pertaining to the dispensing of drugs and medicines. There was a great surge of public responsibility being generated in the minds of our practitioners and within a very few decades legislation was passed by every state and territory delineating the practice of the profession. This was followed by organizing pharmacists in each of our states for the purpose of promulgating the finer principles of the profession. In these latter days of the nineteenth century and the early days of our present century the requisites to practice pharmacy were based on the apprenticeship system whereby the novice gained a certain amount of experience under the guidance of a practicing pharmacist and became registered to practice when he successfully completed an examination given by the board of pharmacy in his state. This method of training, however, was not sufficient to give to the

pharmacist the necessary background material for successfully operating as the community consultant and advisor. Neither did it fit him to assume the position of authority in the matter of understanding the newer medications being discovered following the first World War. Training on a much broader scale was recognized by the leaders in the field and states began to require training on the collegiate level in addition to that received in practice. A two year course of study became a requisite, followed in the middle-twenties by a three year requirement and in 1936 all of our states placed in their laws the requirement for an applicant to receive a bachelor degree in pharmacy from a recognized college before he would be given the right to practice his profession. This was further expanded at the last meeting of the American Pharmaceutical Association this past August in Boston when a five year educational program was adopted. An applicant is also required, in every state, to have an additional one year of intern training under the personal supervision of a preceptor pharmacist.

These educational requirements have not come a bit too soon. Our practicing pharmacists have had to take seven league strides to keep up with the revolution that has been taking place in the drug industry. They have had to become more and more the consultant rather than just the dispenser of medications. The direction of their efforts has been changing with increasing rapidity as the frontiers of medical discovery have been advancing further and further into the unknown. The drugs being dispensed today are appearing in ever-increasing numbers and they have forced into non-existence the time honored medications of past years. With the manual compounding of prescriptions receding, the pharmacist is called upon to broaden his knowledge to adequately serve the health needs of his community. We have seen the advent of new discovery become almost commonplace. Diseases considered fatal a few years ago have been succumbing to the increasing knowledge of our research scientists. Medical discoveries have been astound-

ing us and the almost impossible is being accomplished.

The monies being expended for pharmaceutical research have increased more than ten-fold in the past twenty years and since the first World War the number of men engaged in scientific research has increased more than fifty-fold. Our industry is now expending more than one hundred million dollars a year in the development of medications for the alleviation of disease. The shelves, and especially the refrigerators, of the corner drug store have come to be occupied by an increasingly higher percentage of materials whose use is directed to the preservation of health and the prevention of disease. Traditionally the pharmacist, like the physician, has been largely concerned with the materials of curative medicine but we are finding an increasing number of pharmacists rendering direct service in the public health field, serving with state or federal agencies concerned with the regulation and standardization of drug products. In fact, in the broadest sense, any professional function performed by the pharmacist, which is not a direct service to an individual but rather an organizational service to the public or groups of individuals, takes him into the field of Public Health as it is broadly conceived today.

In this category of service we must recognize the fact that, as a professional person supposedly informed on matters pertaining to health and being easily accessible to the public, the pharmacist is the logical target for requests for all sorts of information on health matters. Whether he likes it or not he finds himself called upon for his opinion relative to the danger or usefulness of fluorides or chlorine in the village water supply, the control of pests, the local school health program, the need of the community for a new hospital and countless other matters. The educators in our seventy-four colleges of pharmacy are providing their students with the background of knowledge as to the modern concept of Public Health and fitting our pharmacists for the place they will occupy in it. By providing this background the

pharmacists are being created into much better informed citizens and are being prepared for community leadership in their training as professionals.

Another important service rendered by pharmacists is in the field of toxicology. Pharmacists know how to treat poisoning from various drugs and quite frequently are contacted by physicians to ascertain just what poison is present in a certain preparation together with the method of its treatment. There are other times when a pharmacist must personally administer emergency treatment until a physician may arrive or instruct a customer over the telephone when a physician cannot be immediately reached. I was most interested in a joint program being put into effect in my home State of Arizona. The Medical Society and the Pharmaceutical Association collaborated in the distribution of a booklet outlining procedure for the public to follow in numerous emergency poisonings. This booklet, together with a bottle of the universal poison antidote was made available by the associations as a free service to the general public in every pharmacy in the State.

I recently read an editorial in the *Oil, Paint and Drug Reporter* which stated in part that—"Pharmacy, in common with all other groups that labor in the still not adequately covered field of health service, has much yet to do. One of its unfinished tasks is presented by the all too common 'common cold' and by other ailments of a somewhat similar origin. In the remaining tasks, it will serve best in close cooperation and collaboration with medicine, initiated on the age-old basis of the relations of local doctor and druggist and carried to the farthest reaches of national—yes, global—activity. There should be developed, for example, a close working interchange of results, needs and suggestions between laboratory and clinical pharmacology. There should be at the other end of the health service line, joint conferences of local medical and pharmaceutical groups. Much good was done several decades ago by way of such efforts in the movement to acquaint physicians better with the re-

sources of official *materia medica* and to promote the use thereof. The field of opportunity—and of need—is far wider today, and it is spreading.

"Pharmacy is getting better acquainted with itself in the sense of its responsibilities to the public and, perhaps of greater importance, with respect of its essentialities in public welfare. And upon the basis of that acquaintance, it is putting still more effort into its long-practiced advance of self-development and self-regulation.

"Pharmacy is rapidly becoming the health informant of the public, operating in that role in all its segments and especially where it has its unequalled close relation with the public—at the community prescription counter. The organizations designed for the information of the public in all matters of health and for the soliciting of public support for health services should enlist the pharmacist as their contact representative and the disseminator of their messages."

Pharmacists are beginning to see themselves in a newer and much larger perspective. They are starting to ask themselves some soul searching questions, such as, "What are we? Whence have we come? Whither are we going? To what degree are we free? What new possibilities is science continually opening before us? What sources of strength and spirit are open to us?" The hope for the longer future lies in a growing understanding of the conditions for the good life of man in a world of science and technology together with the acceptance of a morality that is consistent with these newer conditions. Men are learning with a large amount of newly found emphasis that health and abundance are best achieved by cooperative effort.

Pharmacists are learning to cooperate more and more because of the effect of pharmaceutical advances we have been witnessing. We are cooperating in the mass production of drugs, in the selling of these drugs and in dealing more adequately with the

manifold infectious diseases that once tended to decimate whole populations.

The goals toward which all of mankind is striving are no different from those of the ancient Greeks whose principle search was for an understanding of the truth. This civilization of ours may be a scientific one but more is necessary if it is to continue its progress. We have paid quite a price for electric lighting, radio, television, airplanes, wonder drugs and all of our other achievements and the price has been a loss of our spiritual values. We are going to need to approach those values if we are successful in solving some of the problems we are being confronted with in this present age. The old values we have used in past years are rapidly being cast out of our lives and we are having to recognize and become a part of the tremendous advancements that are being achieved throughout every portion of our daily lives.

We who have been fortunate enough to identify ourselves with the various branches of the drug industry are highly gratified. The drug business does cater to basic human welfare, for without health there is little life to be enjoyed. We could take a page right out of the storybook and yet fail to improve on the romance which is Pharmacy's heritage. Life is a continuous process and, while few of the ancient medicinal agents have been able to survive the merciless pace of medical research, there have been few changes in the basic principles governing human welfare. To a man we are all working against time to develop and understand drugs that will mitigate or control or cure all forms of disease.

The thousands of community health information centers—our pharmacies—located throughout the length and breadth of our country, join us in the sincere desire to see the actions that have been demonstrated through the years continued in an ever-broadened field of operations.

The Current Status of the International Pharmacopoeia*

By

LLOYD C. MILLER, PH.D.

Director of United States Pharmacopoeial Revision

FORMAL discussion of an international pharmacopoeia began nearly a century ago as physicians and pharmacists recognized the desirability of greater uniformity in drug standards from one nation to the next. Events of the intervening decades have turned what was then merely quite desirable into what is now an absolute necessity.

The objective of the International Pharmacopoeia is to eliminate intranational differences in the nomenclature and in the standards of purity and strength for drugs.

Of all the groups having to deal with medicine on a large scale it would seem that an association such as this, for whom uniformity is a creed, should be in a position best to judge the nature of the need for uniformity. These remarks are aimed at explaining how the International Pharmacopoeia came into being and examining how well it promises to serve the original purpose of drug standardization on an international scale.

The tangible beginnings of the Ph.† were two international conferences held in Brussels under the sponsorship of the Belgian government, first in 1902 and again in 1925. These conferences brought about

agreement among the 20-odd signatory nations on the standards of strengths for about 100 drugs and especially on certain general propositions on the strength of standard dosage forms. For example, it was agreed that tinctures should be of 10% strength or 1 gram of crude drug (of standard strength) for each 10 ml. There were other provisions but the essential and important consideration was that agreement had been reached on an international scale in respect to drug standards.

The instruments for attaining international uniformity in drug nomenclature and potency, to which the United States was signatory, were in force, though scarcely operative, until 1952, when set aside by a document negotiated by the World Health Organization. The latter has now been signed by representatives of most of the countries which had signed either or both of the two earlier agreements. It is important to note that the WHO instrument does no more than abrogate the two Brussels Agreement and sets up no new agreement in their place.

Behind this WHO action in cancelling out the Brussels Agreements was the decision that their purpose could now be accomplished better by another means. This was the advice of the Expert Committee on the Unification of Pharmacopoeias, a body which WHO inherited practically intact from the Health Organization of the League of Nations. The latter had undertaken a program in 1937 aimed at greater uniformity in drug standards but its work had been interrupted in 1939 by the war. The work was taken up again in 1947 with the subsequent creation of the World Health Organization as a part of the United Nations. At this time the conclusion was reached that the best way of bringing the various national pharmacopoeias more nearly to the same common standards was to create

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† The word "pharmacopoeia" is now spelled in a variety of ways. The primary title of the International Pharmacopoeia is in Latin, *Pharmacopoea Internationalis*. The anglicized form is International Pharmacopoeia, for which the abbreviation is Ph.I. (the more conventional initials P.I. having been preempted in the past for the *Protocol Internationalis*.) The English still retain the diphthong oe, i.e., pharmacopoeia, but beginning with the present U.S.P. (the Fourteenth Revision), the diphthong has been omitted with the single exception of the corporate title of the permanent organization behind the U.S.P., The United States Pharmacopoeial Convention.

an international pharmacopeia. It was intended that the latter, by serving as a model compendium, would gradually bring the national pharmacopeias more nearly together. The task of drafting this international compendium was assigned to the Expert Committee on Unification of Pharmacopoeias.

The members of this Expert Committee were men of long experience in pharmacopeial standards. However, the WHO felt the need for tapping broader areas of experience than any group of six to eight experts could possibly provide. This held not only for pharmacopeial matters, but for the entire range of WHO activities. Hence, in 1950, the present system of appointing expert advisory panels was established whereby many experts are asked to serve, some only as correspondents. In the course of this reorganization, the title of the pharmacopeial panel was changed to "The Expert Advisory Panel on the International Pharmacopoeia," and it now comprises 30 experts from 17 countries. There are about 50 other WHO expert advisory panels, some of which are established jointly with other United Nations bodies.

Each panel member is appointed with the consent of his government for a five-year term. It is made very clear to him that he serves as an individual expert and is not to act under instructions from his government or any other organization.

From time to time as needed, the WHO Director-General invites eight to ten members of the panel to convene as an expert committee for study and consultation on the panel's program under the guidance of the WHO permanent secretariat at Geneva. It goes without saying that the bulk of the work is done in these committee sessions, although panel members contribute effectively by correspondence, especially if they have once served as committee members.

The Expert Committee on the International Pharmacopoeia meets once or twice annually, usually in Geneva, and at WHO expense. Between sessions, the members work actively by correspondence. By 1950

the text of some 217 monographs on basic drugs and their dosage forms had been written. Rather than allow this completed work to go stale while new monographs were being drafted, it was published in 1951 as Volume I of the first edition of the *Pharmacopoea Internationalis*.

Since 1951, Volume II of the Ph.I. has advanced to page proof. Since writing a pharmacopeia is as unending as the procession of new drugs itself, Volume II could not be looked upon as completing the first edition of Ph.I. so that an addendum was planned which is well along in preparation. On top of that, work has already begun on the second edition which will represent a complete one-volume revision of the first edition.

In view of its international character, the Ph.I. is being published simultaneously in English and French. A Spanish edition is about to appear under WHO sponsorship with a German translation being published privately with WHO approval. The delays in publication have been long and exasperating. This experience alone would prove an insurmountable handicap in using the Ph.I. as a text of working specifications for commerce in drugs.

In evaluating the Ph.I., we should answer two questions:

(1.) What are the needs for uniformity in respect to drugs? (2.) In what ways would public health, including that of the Armed Forces of the United States and other nations, be benefitted by greater uniformity in drug standards? The answers to these questions may indicate the prospects for success of the Ph.I. program both from the short- and long-range viewpoint.

The most-used example of the need for uniformity in drug standards is that of the civilian world traveler, who unlike the soldier, can scarcely take with him all the drugs he might need on a journey. There are exceptions, of course, as in the case of the chronic cardiac patient who can readily carry a year's supply of digitalis, especially in the more compact form of purified glycosides. His need for replacement enroute

would be limited to the off-chance of loss or theft. The chronic diabetic would find it most difficult to carry and preserve the potency of a long-range supply of insulin and thus would have to count on procuring it enroute. The needs of such patients, however, can be foreseen fairly well in advance, at least well enough to make prior inquiries and preparations. The occasional needs of those taken ill suddenly on foreign soil may be very real and distressing individually but scarcely warrant a mass program on an international scale.

Thus the peculiar requirements of travelers however dramatic they may be, offer only limited support for the concept of international uniformity in drug standards. Possibly the same might be said for replenishing ships' stores of drugs although a proposition is now before the World Health Organization urging that the standards of the International Pharmacopoeia be invoked in whatever maritime regulations control the pharmaceuticals used on board ship. A much better case rests on the basis of national emergencies such as the 1952 floods of the Netherlands. The widespread damage wrought by the intruding sea included loss of both the local supplies and the nearby stores of essential drugs. The imaginations of those trained in military preparedness need no prodding to fill in the details of such a picture. Indeed, much impetus for more rapid progress in international interchangeability in devices and drugs has come from the armed services as a result of the experience in Holland. It takes only a few cases of being supplied with needles that won't fit syringes on hand, of having plasma but no infusion equipment suitable for its administration, or of having drugs with unintelligible labeling, to convince responsible medical men, from pharmacists to physicians, of the virtues of international interchangeability and uniformity.

In consequence, there are several new programs now underway to bring this about. The American Standards Association is involved in most of these such as the standardization of litters and ambulance fittings,

syringes and needles, and of equipment for blood transportation and transfusion. These are all aimed at interchangeability which assumes uniformity at least in respect to size and function of the working parts.

In addition, there has been discussion of a "White Pool Pharmacopoeia," on the part of the Benelux countries. This seems to have gone no farther than the stage of discussion in one or two conferences. It has been amply pointed out that a "White Pool Pharmacopoeia" would represent an unnecessary duplication of the effort being expended by the WHO. However, the mere expression of a serious proposal of this kind is evidence of the belief that an international compendium of drug standards has great potential value.

The best case for the Ph.I. is that of the small nation wholly dependent upon import for its drugs. For reasons of national pride, such nations are often reluctant to adopt for their own official purposes, the pharmacopoeia of a foreign country. There are some notable exceptions as for example, the adoption of the U. S. Pharmacopoeia by Ethiopia. Similarly, many Latin American countries have adopted both the U.S.P. and/or one or another of the more up-to-date national pharmacopoeias. In the lack of a working Pharmacopoeia of any kind, the problem of treating the sick must be complicated many-fold for there is added to the diversity in brands and kinds of drugs a diversity also of their strengths.

Concluding that greater uniformity in drug standards is essential, let us address ourselves now to the question of how an international pharmacopoeia can achieve this. In the long run the Ph.I. may have a very important influence on national drug standards. In the immediate future, however, it is likely to lag behind national pharmacopoeias and thus exert little effect in bringing them into conformity. This is not to imply that the Ph.I. standards are inadequate. In general, they are very high indeed and compliance with them will assure pure and fully potent drugs. In only a few cases is there a substantial difference in the Ph.I. stand-

ard and that of the U.S.P. or B.P. But generally the latter will have become so firmly established by the time the Ph.I. gets published that there will be little disposition to change.

Another reason for this is the fact that with certain exceptions, the WHO is not in very direct contact with the national pharmacopeia commissions. This results from two facts. First, the official channel of communication between WHO and the Member States is through the latter's ministry of health, our counterpart of which is the Public Health Service. Unless the ministry operates very effectively, correspondence may bog down. Second, the WHO selects its advisory panels from experts in each field and frequently these experts are not in a position to speak for the pharmacopeia commission of their country. Thus, unless the latter is willing to go somewhat out of its way, the chances are not good for really active cooperation with the Ph.I. program.

Doubtless there would be a great deal of resistance to making any of the Ph.I. provisions binding upon the national commissions. Certainly that would be the reaction here where very close contact is being maintained between the U. S. Pharmacopeia and the National Formulary in this country and the World Health Organization abroad.

Fear has occasionally been voiced here that the WHO plans to have the Ph.I. supplant the various national pharmacopeias such as the U.S.P. No such intention has been expressed either publicly or otherwise

as far as we are aware. However, the fears may not be without substance if we pay any credence at all to those who advocate world federation. That is, these advocates would have us expect that the day may come in the far distant future when some or all of our national instruments of law and order will give way to international counterparts. Needless to say, there is very little sentiment in that direction at this time.

On the constructive side, it would seem that one of the greatest services that the WHO can render would result from its program to eliminate confusing differences in nomenclature of drugs. While nothing can be done about multiplicity of trade names, it seems well within the realm of possibility to agree upon common or generic non-proprietary names for drugs coming into general use. The emphasis at present is on the selection of such names. If the WHO were to list these names in a separate, regular, periodic publication, including a description of the drugs themselves, it might prove of great help to all concerned including especially those responsible for the health and welfare of the armed services. Doubtless, the substitution of such a periodical, even on a subscription basis, for the International Pharmacopoeia would not be looked upon with favor by WHO. Hence within the foreseeable future the Ph.I. will probably remain as an unofficial supranational compendium of recommendations to the 20-odd national pharmacopeial bodies and as a primary source of standards for those nations not having their own pharmacopeias.



The Role of the Pharmacy Committee in Drug Evaluation, Selection and Utilization and Its Importance to the Accreditation of the Hospital*

By

C. K. HIMMELSBACH, M.D., F.A.C.P.†

(With one illustration)

AS WE highlight (for "highlighting" is all that time will permit) the role of the pharmacy committee in the evaluation, selection and utilization of drugs, and the importance of this committee to the accreditation of a hospital, I am reminded of the classical comment of George Eliot, that "One couldn't carry on life comfortably without a little blindness to the fact that everything has been said better than we can put it ourselves."

To illustrate my point, and to, at the same time, cover the subject allotted to me, let me make the following brief observations:

First—The Minimum Standard for Pharmacies in Hospitals, as issued by the Division of Hospital Pharmacy of the American Pharmaceutical Association and the American Society of Hospital Pharmacists, and endorsed by the American Medical Association, American Hospital Association, and Catholic Hospital Association, a standard adopted by many of our progressive hospitals, outlines the duties and functions of a pharmacy and drug therapeutics committee. In this connection, the standard states, "The purpose of the committee shall be:

- a) To develop a formulary of accepted drugs for use in the hospital;
- b) To serve as an advisory group to the hospital pharmacist on matters pertaining to the choice of drugs to be stocked;

- c) To evaluate clinical data concerning drugs requested for use in the hospital;
- d) To add to and to delete from the list of drugs accepted for use in the hospital;
- e) To prevent unnecessary duplication in the stock of the same basic drug and its preparations; and
- f) To make recommendations concerning drugs to be stocked on nursing units and other services."

Second—Pharmacy and Drug Therapeutics Committees, now in operation in over 1700 of the nation's 7000 hospitals, have individually developed criteria for the evaluation, selection and utilization of drugs. Essentially, these criteria all aim at selecting the best among the available drug therapy agents. Being most familiar with the criteria developed for use in Public Health Service Hospitals, I present these to you:

- a) The therapeutic efficacy of the drug should be well established;
- b) Preference should be given to U.S.P., N.F., N.N.R., and A.D.R. drugs;
- c) Unnecessary duplication of action should be avoided;
- d) Drugs of secret composition are to be rejected; and
- e) Mixtures of drugs unless they provide a real advantage in combination are to be avoided.

Third—Against this rapid review of present day methods and means of drug evaluation, selection and utilization, I now wish to present for your consideration a statement that appeared in the first edition of the United States Pharmacopoeia in 1820:

"It is the objective of the Pharmacopoeia to select from among substances which possess medicinal power, those, the utility of

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† Medical Director, Assistant Chief, Division of Hospitals, Bureau of Medical Services, U. S. Public Health Service, Department of Health, Education, & Welfare, Washington, D.C.

which is most fully established and best understood; and to form from them preparations and compositions, in which their power may be exerted to the greatest advantage. It should likewise distinguish those articles by convenient and definite names, such as may prevent trouble or uncertainty in the intercourse of physicians and apothecaries. . . . The value of a Pharmacopoeia depends upon the fidelity with which it conforms to the best state of medical knowledge of the day. Its usefulness depends upon the sanction it receives from the medical community and the public; and the extent to which it governs the language and practice of those for whose use it is intended."

How beautifully stated! How true of the pharmacopoeia in 1820 and how appropriate it is in 1954! Also, how very, very applicable is this statement, made in 1820, to the pharmacy committee-hospital formulary philosophy of today, for the formulary might well be called the hospital's U.S.P.

After all, the objectives of a pharmacopoeia and a hospital formulary are essentially the same: the selection of drugs, the pharmacology of which is best established and understood and the use of a common, meaningful drug terminology, i.e., official and generic names.

I cannot help but be impressed by Eliot's statement that I quoted earlier, ". . . that everything has been said better than we can put it ourselves"—in this instance, said by our forefathers in American medicine and pharmacy—in 1820, over a century ago, less than fifty years after the birth of our country.

I have up to this point indicated the important functions of the pharmacy committee. I hope I have shown that its aims and objectives are nothing new—just the approach is new—that of a local committee providing for medical self evaluation and appraisal of drug therapy agents as they appear on the scene.

I should like now to pause for a moment and present an approach used by the Public Health Service in indoctrinating its staff and pharmacy committee members on the desir-

ability of a pharmacy committee. I mention it at this point for I believe it will show why the Joint Commission on Accreditation of Hospitals considers this committee and its activities so necessary to a well-functioning hospital. The approach is as follows:

- a) The index to Sollman's Manual of Pharmacology (7th edition shows about 2400 items;
- b) The introduction to The Merck Index (6th edition) states that the text covers 8000 drugs and chemicals;
- c) The National Formulary (9th edition) lists about 500 drugs;
- d) The U. S. Pharmacopoeia (14th edition) lists approximately 500 drugs; and
- e) New and Non-Official Remedies (1952) mentions in the neighborhood of 1000 items.

There is, of course, considerable overlapping in these listings. However, taking this fact into consideration, there are undoubtedly more than 2500 different drugs available at any one time when allowance is made for the continual introduction of new preparations. We do not believe it is an overstatement to say that there are many more drugs available than are necessary to practice good medicine.

All of us are aware of the confusion that this abundance causes in the field of drug therapy. There are too many drugs to choose from; there is a tremendous amount of overlapping; there are too many compounded prescriptions available; and new agents are added at a greater rate than older ones are discarded or declared obsolete. This situation is not new, but the point of concern is that it is allowed to remain with us and grow. The problem of any one physician keeping abreast of the developments and learning to distinguish between the good, the better, and the best, always becomes progressively more difficult.

The Council on Pharmacy and Chemistry of the American Medical Association has stated this situation so clearly we would like to quote from one of their writings (Journal of the American Medical Association, Vol-

ume 139, Number 6, February 5, 1949) on the subject, "A fundamental requirement to successful treatment is that the physician have the clearest possible understanding of the remedial agents that he prescribes. This is difficult at best, and is rendered increasingly more difficult with multiplication of agents that are nearly, but not quite, equivalent. Each may show minor differences, which may or may not be important, but which are difficult to learn if he spreads his experience too widely, and, therefore, too thinly. It were much, much better for medical practice—if modifications which do not offer substantial advantages were shunted into the discard before they see publicity and add to the confusion of the practitioners."

We in the Public Health Service firmly believe that a better job of successfully treating the sick can be done if our therapeutic armamentaria are reduced to carefully selected, indispensable, tried and true drugs which we learn to use well. The fact that our hospital pharmacy committees have developed formularies, we believe indicates the existence of a felt need for bringing order out of a chaotic situation.

To further dramatize the need for sound drug evaluations, it might be helpful to visualize the life cycle of the average drug. I have attempted to portray this diagrammatically in figure 1.

LIFE CYCLE OF THE AVERAGE DRUG

The drug is introduced at "a." It becomes quite popular and reaches a peak of usage at "b." Some of its deficiencies become apparent and physicians become overly cautious, dropping its use to an abnormally low level at "c." With further experience the drug's use later rises to an optimal level at "d." Finally, as better agents are developed, it proceeds to obsolescence at "e."

This cycle is quite rapid with some drugs and very slow with others. It took quinine 323 years to approach "e." On the other hand, sulfanilamide ran its course in a decade. Although some fundamental agents, like sodium chloride and dextrose, may never become truly obsolete in the practice of medi-

Fig.1 LIFE CYCLE OF THE AVERAGE DRUG

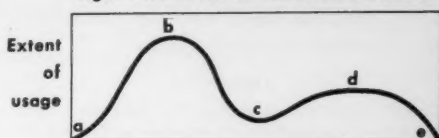


FIG. 1. Life cycle of the average drug.

cine, this diagram does serve to help one visualize the usual dynamics in the field of drug therapy.

In closing, let me present five questions drawn from those compiled by Dr. Jose Gonzalez, Field Representative of the American Hospital Association, as a guide to those seeking accreditation; questions that clearly indicate the importance of the pharmacy committee and its place in the accreditation system of hospitals.

- "1) Is there a Pharmacy and Therapeutics Committee on the staff?
- "2) Has a Formulary been developed to standardize accepted drugs for use in the hospital, to choose items to be stocked, to evaluate clinical data concerning drugs requested for use in the hospital, to prevent unnecessary duplication in the stock of the same basic drugs and their preparations and to recommend stock items for distribution in the nursing units?
- "3 Are all drugs for nursing units standardized as per recommendation of the Pharmacy Committee?
- "4 Are only U.S.P., N.F., N.N.R., and A.D.R. preparations used?
- "5 Is there any evidence of excessive use of proprietary preparations?"

A formidable list, don't you agree, and to which I am sure the following are added by the inspectors in their visitations:

- "1) How many meetings are held annually by this Committee?
- "2) Are minutes of the meetings available? Are these complete with pharmacological bases for the acceptance or rejection of drugs?
- "3) Are minutes released promptly to all individuals concerned? and

- "4) Are generic and official names used in drug labeling, formulary writing and patient chart recordings?"

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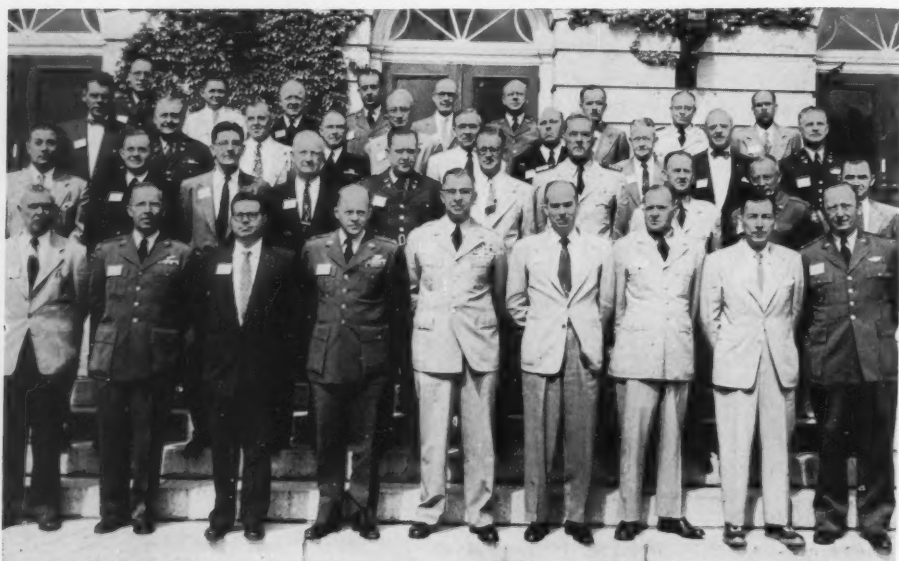
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The Accreditation Responsibilities of the Chief of a Pharmaceutical Service Relative to the Hospital Formulary and Controlled Drugs*

By

JOHN A. SCIGLIANO, Ph.D.†

BEFORE enumerating the responsibilities of the Chief of a Pharmaceutical Service relative to the Hospital Formulary may we define our concept of formulary. It shall indicate not merely a list of items in the manner of the traditional formulary, but primarily the incorporation of the principles of a sound but adjustable system of drug therapy. The goal of a formulary is improved drug therapy. This is accomplished by a cooperative effort that eliminates any implication of interference with personal choice of drug.

The main object is to select the best, simplest and safest medicinals currently needed in the prevention, diagnosis and treatment of disease; the criteria to be used in this selection principally to be therapeutic efficacy of the drug. Avoid duplications and secret compositions and consider mixtures only when there is evidence of advantage over individual components.

When additions and deletions are effected through the Pharmacy and Therapeutic Committee action, prescriber's freedom is maintained, the prescriber is encouraged to think through reasons for adding or deleting, avoids cluttering of stocks, presents standard of comparison for evaluating new agents and the adoption of basic scope and procedure for going beyond and helps provide patient with the best drug therapy.

Now, then, the Chief Pharmacist can best discharge his responsibilities in this aspect

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† Chairman, Committee on Minimum Standards, American Society of Hospital Pharmacists and Senior Pharmacist, U. S. Public Health Service, Clinical Center, National Institutes of Health, Bethesda, Maryland.

if the results contribute to the welfare of the patient, gives service to the hospital and professional staff with a resulting fusion of the role of Pharmacy into the broader aspects of medical care.

That the formulary plays an important role in the accreditation picture in that one of the requirements of the "Joint Commission on the Accreditation of Hospitals," as well as of the "Minimum Standards for Pharmacies in Hospitals," is that the hospital have an active Pharmacy and Therapeutics committee which shall develop a formulary of accepted drugs for use in the hospital. The number of formularies now in use also stands as evidence to the need for and value of formularies. A report in the latest Administrators' Guide issue of "Hospitals" states that 2,537 of the 4,370 hospitals reporting, have formularies.

To guide inspectors a point rating system is used. The Pharmacy Service is allotted a total of 20 points of the hospital's possible 1000 points. The essentials on which the Pharmacy is evaluated are:

1. The location. Is it suitable with adequate space? (maximum of 2 points)

2. Answers to these questions: Is there a well stocked pharmacy with a Registered Pharmacist? Drug room only? (maximum of 4 points)

- (b) Is the Pharmacy well equipped? (maximum of 2 points)

- (c) Is there control of the department in the absence of the Pharmacist? (maximum of 2 points)

3. Are only USP, NF, NNR preparations used? (maximum of 2 points)

4. Are narcotics handled under properly controlled conditions? (maximum of 2 points)

5. Is there an active Pharmacy Committee

of the medical staff? Has a formulary been adopted and is it kept up to date? (maximum of 4 points)

Accreditation inspectors request to see not only formularies but also supplements.

From the administrator's point-of-view the formulary effects the economy of control and rapid turnover of drug stocks by minimizing duplication of therapeutically similar drugs, as well as appreciating the sound financial operation of a Pharmacy which does as much business as possible with as low an inventory as possible.

Now let us review how a Chief Pharmacist can effect a soundly functioning formulary system:

1. Prevent duplications in inventory of identical drugs carried under various trade names.
2. Alleviate the "dead stock" problem.
3. Reduce amount of total inventory necessary.
4. Prepare for suitable adjustment of price declines.
5. Control "dated" drugs.
6. Secure better prices by quantity purchases.
7. Secure better prices by having a number of quality manufacturers bid on the drug under the "generic" name even though supplied under "trade marked" name.
8. Respond to the prescribing habits of the physician.

With respect to "controlled drugs" the

Chief Pharmacist is responsible for procurement, receipt and usage records and uniform and effective inventory audit. You will note that the "point rating system" allows a maximum of two points to be added to the evaluation of the Pharmacy for handling of narcotics under properly controlled conditions.

The Pharmacist is responsible for maintaining accurate perpetual inventory records of the controlled drugs in his custody. This shall reflect all receipts and issues, including those dispensed to Nursing units, to clinics and to individual outpatients. The system shall adequately cover returns of unusable drugs, as broken tablets, contaminated injectibles and items which have been discontinued. Returns, other than narcotics, may be destroyed. The narcotics are held in a secure place for ultimate disposition by the Narcotics Bureau.

The ideal system includes a secure place for storage of the narcotics, simple hypnotics, and spirituous liquors apart from other stocks of drugs; is complete with appropriate forms including eight hour audit on the Nursing units and prescribes that delivery be effected directly from custody of pharmacist to custody of nurse.

Other pertinent details of a complete system of controlled drugs shall include a separate numbering system, separate record for each item, records of exempt narcotics and the maintaining of the records in an accessible place for a period of two years.



Pharmaceutical Aspects Involved in Accreditation of Hospitals*

By

CHARLES LETOURNEAU, M.D.†

THE QUALITY of pharmaceutical services rendered in hospitals is a matter of some importance in the accreditation of hospitals. Some complaints have been received from pharmacists, that the hospital pharmacy is not given the importance that it deserves in the point rating system. This point of view undoubtedly deserves consideration because of the tremendous strides that have been made in the profession of pharmacy during the last decade.

However, the standards, like the law, rarely keep pace with scientific development. The standards as presently applied were originally conceived in 1918 and last revised in 1946 by the American College of Surgeons before being conveyed to the Joint Commission on Accreditation of Hospitals.

The present standards of the Joint Commission on Accreditation of Hospitals place the pharmacy as one of the contingent requirements for hospitals, that is to say, desirable but not absolutely pre-requisite to the accreditation of a hospital.

The standards of the Joint Commission are simple and are divided into six headings which are as follows:

1. Organization—There shall be a pharmacy directed by a registered pharmacist.
2. Facilities—Facilities shall be provided for the storage, safeguarding, preparation and dispensing of drugs.
3. Personnel—Personnel competent in their respective duties shall be provided

in keeping with the size and activity of the department.

4. Records—Records shall be kept of the transactions of the pharmacy and collated with other hospital records where indicated. Such special records shall be kept as are required by law.
5. Standards—Drugs dispensed shall meet the standards established by the United States Pharmacopoeia, National Formulary, and New and Non-Official Remedies. (to this must also be added Accepted Dental Remedies.).
6. Conferences—Departmental and inter-departmental conferences shall be held periodically.

It must be remembered that the program of accreditation of hospitals was originally designed to improve the quality of surgery in hospitals. The standards were formulated by a group of surgeons of the American College of Surgeons who naturally placed emphasis upon surgery. While recognizing pharmacy as important enough to consider, it was not important enough to be placed among the major departments. In looking back at the status of the profession of hospital pharmacy in 1918, this seemed to be quite logical *at that time*.

Members of the profession of hospital pharmacy will recognize that there has been a tremendous change of orientation within the profession since 1918 which would warrant a reconsideration of its status.

Some excellent standards were established by the American College of Surgeons in 1946, but experience showed that the standards as set were impracticable for most hospitals to reach.

The new standards of the Joint Commission on Accreditation of Hospitals are minimal and non-specific. The purpose of these standards is to insure that good, safe

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† Director, Program in Hospital Administration, Northwestern University; Editorial Director, Hospital Management Magazine.

work is being done in the pharmacy. The standards of hospital pharmacies will be raised gradually but much of this will depend upon the efforts of the American Pharmaceutical Association, The American Society of Hospital Pharmacists and the American Hospital Association. Even now a Joint Committee of these organizations is considering a standard that will be realistic and will not be too high for most hospitals to meet with some effort. The Joint Committee welcomes suggestions from all interested

groups, but recognizes that there is much research to be done as to what constitutes an acceptable standard for a pharmacy and realizes also that an educational campaign is necessary both among pharmacists and among hospitals to make them conscious of the necessity for raising standards and keeping them high. A standard must be raised gradually, and like a great city rising stone upon stone, the process of getting good pharmaceutical services in all hospitals cannot be accomplished overnight.



Desirable Qualities

Cecil John Rhodes, an English administrator, was born in 1853 and died in 1902. He headed the British South Africa Company which settled that portion of south central Africa named in his honor,—Northern Rhodesia and Southern Rhodesia.

In his will, Mr. Rhodes provided the means for the establishment of the Rhodes scholarships at Oxford University in England and enumerated those desirable qualities which a Rhodes scholar should possess. Among these were:

- (1) Literary and scholastic ability and attainment.
- (2) Qualities of manhood, truth, courage, devotion to duty, sympathy, kindliness, unselfishness and fellowship.
- (3) Exhibition of moral force of character and

of instincts to lead and to take an interest in his schoolmates.

- (4) Physical vigor as shown by fondness for and success in sports.

Mr. Rhodes stipulated that the most important requirement for a Rhodes scholarship was the possession of some "definite quality of distinction, whether in intellect or character." He said: "The Rhodes scholar should not be a one-sided man. Thus, special distinction of intellect should be founded upon sound character, and special quality of character upon sound intellect. . . ."

Mr. Rhodes evidently regarded leadership as consisting of moral courage and interest in one's fellow men quite as much as in the more aggressive qualities.

Trends in Pharmaceutical Education*

By

HUGH C. MULDOON, D.Sc., Dean

School of Pharmacy, Duquesne University, Pittsburgh

THE major advances in any profession are sparked by its colleges. It is good to know, therefore, that just now pharmaceutical education is especially vigorous and active. The decision reached last August by the American Association of Colleges of Pharmacy to extend the minimum curriculum in pharmacy from four to five years is the most notable evidence of recent progress.

This introduction of prepharmacy training, a highly commendable if somewhat venturesome advance, places pharmacy educationally on a new and higher plane. It brings it more nearly in line with the other health professions. Increased pride of craft, better community service, and improved professional prestige will follow. As a minor benefit will come a re-evaluation of the pharmacist's position under Selective Service and in the armed forces.

The new regulation requires that students who begin training in 1960 must complete one or two years of arts college training, in addition to the usual professional courses, before an accredited college may confer upon them the B.S. in Pharmacy degree. Under the terms of the resolution the college of pharmacy may, if it cares to do so, conduct all five years of the program. That may happen in a very few cases, perhaps, but the probable trend will be to demand two full years of prepharmacy training for entrance. This will require the college of pharmacy to offer only the minimum three years of professional instruction that is specified in the resolution. Such a 2-3 program will find special favor in those geographic areas where two-year junior colleges, as well as

other institutions of collegiate grade, can serve as convenient feeders.

The one-year extension of the curriculum was voted by an overwhelming majority of the country's seventy-four recognized colleges of pharmacy, the same schools that in 1950 rejected, but not by a large majority, a proposal to make the minimum course six years. In a sense, then, the five year plan is a compromise. Undoubtedly, agitation will continue to extend the course to the six years originally demanded, so that a doctorate in pharmacy may properly be conferred.

Actually, the five year course is already here. At least fifteen colleges of pharmacy anticipated the action of the national association. Some schools have had a five year course in operation for several years. In June, 1954, the University of Southern California graduated its first six year class of more than fifty students, conferring upon them the degree of Doctor of Pharmacy.

The great majority of practicing pharmacists, however, and not a few educators as well, are not yet willing to approve a compulsory six year plan. They consider it an economically unsound, extravagant advance. Although the adoption of the five year plan had been approved in principle earlier by the American Pharmaceutical Association, and the National Association of Boards of Pharmacy, and other important national and regional associations, it was stoutly opposed by numbers of educators and retailers, by certain pharmaceutical manufacturers, and by the influential National Association of Retail Druggists. Once action had been taken, however, major opposition appeared to subside.

It was time for a change. The pharmaceutical curriculum had not been lengthened since the four year course was adopted in 1933. A twenty-year old plan of study can-

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not be expected to meet well today's changed and increased needs. It is true that educators made very sincere efforts to keep the four year curriculum in pace with the times. They introduced important changes in methods and courses and course content. But more and more they became convinced that the four year course must be extended. It could not possibly accomplish for the student all that should be accomplished.

Eventually, the insistent demand of the educators for a lengthened course received strong factual support when the findings of the Pharmaceutical Survey were published in 1948. The Survey was a very costly three-year study of modern pharmacy in all its ramifications, made by the American Council on Education, an independent and impartial agency. The Survey confirmed the opinion of many educators that while a four year course may produce a technically proficient pharmacist, it fails to make him at the same time the cultured, broadly educated, socially conscious citizen the modern pharmacist should be.

A change had to be made if the pharmacist is not to degenerate into a mere technician, but is to remain a respected worker in the health sciences, one who deserves the special respect and consideration due a professional man. The five year course is the first big step ahead. Its aim is not to teach more pharmacy. It was adopted specifically to provide for the teaching of non-professional courses that will fit the pharmacist better for his personal living and prepare him more adequately for leadership in community affairs. What the pharmacist thinks and says often has an important influence on the people of his district. His advice is sought; his judgment respected. He is, or he should be, interested not only in the health and well-being of the people he serves, but also in the development of his community and its moral climate. He should have informed opinions on the great social and political and economic and ethical questions of the day. He should be able to express them clearly and defend them under

attack. But today's curriculum, which is approximately eight-five per cent scientific and professional, offers the pharmacist little help in developing his personal and civic interests.

But there is another reason why the educational base should be broadened. Once, colleges prepared their students for the retail field alone. They may no longer do so. Students with other interests must be considered. Pharmacy has developed into a group of professional specialties of which retail pharmacy is but one, although measured by the numbers it employs it is by far the most extensive. Today, only 94,700 of our 106,590 registered pharmacists practice in retail establishments. Some 12-15 per cent of our college students have no desire to enter the retail field. They will engage, instead, in pharmaceutical manufacturing, distribution, sales promotion, hospital pharmacy, wholesaling, journalism, association activities, education, research, or in some other related field.

The increased specialization of functions makes it necessary for colleges of pharmacy to offer not one Procrustean curriculum, as so many colleges have done in the past, but a choice of plans of study adjusted to student interest and future purpose. Adding a year will make the providing of such multiple programs easier. Pharmacy is, of course, always in competition with other professions for manpower. It attracts young people sometimes by the very variety of its outlets. In his selection of a life work the student considers the economic desirability of a calling as reflected in its financial returns balanced against the time and cost of training. We believe, however, that young men and women who are really interested in pharmacy will not be deterred by the additional cost of the longer course.

Lengthening the curriculum just now is a bit courageous, perhaps, since pharmacy enrollments have decreased steadily and very considerably over the past five years. There are several reasons for the decline. The higher admission standards that now pre-

vail may have had an effect. General economic conditions may be involved. There may have been a lack of proper counseling. World War II G.I. programs came to an end. But, whatever the reason, during the past five years fewer student applications have been processed. Some 16,000 students now attend our accredited colleges, but this is 5,000 fewer than attended in 1949-50. Each year has shown a decline of about 1,000 enrollees. Fewer students necessarily mean fewer graduates. In 1953, 3909 B.S. in Pharmacy degrees, 123 Master of Science, and 113 Ph.D. degrees were conferred. And there is still a shortage of pharmacists in the retail field.

Educators are not unduly alarmed about enrollments. Local recruiting endeavors have borne some fruit. Very recently, the American Association of Colleges of Pharmacy made available an attractive brochure *Shall I Study Pharmacy?* Various individuals and groups have subsidized the distribution of some 75,000 copies of it to libraries, vocational advisors in secondary schools, interested individuals, and others all over the country. The beneficent effect of such widespread dissemination is already apparent. But far more important in the calculation of educators is the tidal wave of students that is expected soon to strike all American colleges and universities. The prediction is that the total college population of the country will increase by 16 per cent in 1960, by 46 per cent in 1965, and by 70 per cent in 1970. Should pharmacy get its usual proportion of these students, and we predict it will despite the lengthened course, there will be no dearth of students in our colleges.

The adoption of prepharmacy training is not the only recent advance in pharmaceutical education. There are many others of which we are proud. Most of them stem either directly or indirectly from the Pharmaceutical Survey. Within the past ten years the physical facilities of our colleges have been improved immeasurably. The American Council on Pharmaceutical Education reports that in 1953 alone, two colleges were

erecting buildings; two other buildings were in the planning stage; three schools had moved into new buildings shared with other departments; and five had doubled their floor space by adding new wings. School equipment has been modernized and augmented, libraries enriched. Faculties have been strengthened, teaching conditions improved, and instructional procedures revised. Research has been encouraged. Students receive the benefit of sound counseling. Membership in professional associations has been stimulated through student memberships. Some 10,000 young collegians are now enrolled as student members of the American Pharmaceutical Association. Continuation education for graduates has been offered, but with rather disappointing results. In contrast to this we point out as one of the most significant and most heartening developments, the increased interest expressed in education by an awakened pharmaceutical industry, whose financial contributions are increasingly generous. Pharmacy at last is accepting its responsibility to take care of its own.

The American Association of Colleges of Pharmacy, the American Pharmaceutical Association, the National Association of Boards of Pharmacy, and many other organizations and individuals have contributed importantly to pharmacy's recent academic progress, but two agencies, the American Council on Pharmaceutical Education and the American Foundation for Pharmaceutical Education, must have special mention.

The American Council on Pharmaceutical Education is the sole national accrediting agency for colleges of pharmacy. As such, it wields enormous power for good. The conscientious work of the Council and its evaluators, and their insistence on high standards, are directly responsible for most of the gratifying improvements in our schools—physical, academic, and even spiritual. The higher standing of pharmacy on many campuses is a result of the Council's suggestions and advice, and sometimes its demands. In 1940, the Council published its first list of accredited colleges, listed on a letter basis.

Immediately the colleges were stimulated to great activity either to attain, or to maintain an "A" rating. The current list shows 68 Class A colleges, 2 Class B, and only 3 in Class C.

The Council is an independent agency composed of three representatives each of the American Association of Colleges of Pharmacy, the American Pharmaceutical Association and the National Association of Boards of Pharmacy, and one representative of the American Council on Education. The Council is supported by annual contributions from the three participating organizations and by substantial grants from the American Foundation for Pharmaceutical Education.

This Foundation was created in 1942 by the National Drug Trade Conference, a body composed of representatives of every national drug and pharmaceutical organization in the country. The Foundation was designed specifically to serve the basic needs of education and industry. It is fulfilling its purpose admirably.

In the last ten years it has spent close to \$3,000,000 in promoting pharmaceutical education. The Foundation's greatest single gift to pharmacy was the sum of nearly \$200,000 needed to defray the expenses of the invaluable Pharmaceutical Survey. It contributes annually to the support of the dignified *American Journal of Pharmaceutical Education*. For the past six years it has subsidized summer seminars for teachers, meetings that are designed to improve teaching in colleges of pharmacy.

More than 1,000 needy undergraduates have already received Foundation scholarship aid. By its support of graduate education in colleges of pharmacy the Foundation has done more than any other agency to provide highly trained teachers for our colleges, as well as competent workers for industry and the retail field. In 1953, the Foundation supported 84 Fellows at 26 universities. These Fellows constitute about 15 per cent of the 570 students enrolled in our graduate schools. Since some seventy per cent of the Fellows enter education, the Foundation is

to a large extent responsible for the upgrading of our faculties. So far, 124 Ph.D.'s have been graduated with Foundation aid. Out of a total of 685 teachers of all ranks in four subject divisions in our colleges of pharmacy, 116 of those in pharmaceutical chemistry hold the doctorate; so do 102 in pharmacy, 83 in pharmacology, and 55 in pharmacognosy. Not many years ago, such highly trained men were not to be found.

By aiding graduate education the Foundation has stimulated research. At the recent A. Ph. A. convention in Boston, 429 papers were presented. A considerable number of these, however, were not based on laboratory research. Some 57 per cent of the papers published in 1953 in the *Journal of the American Pharmaceutical Association, Scientific Edition*, were reports of studies carried on in our colleges of pharmacy by nearly 200 individual researchers. These figures do not tell the whole story, for the *Journal* is only one of a number of publications in which researchers in pharmacy's several fields report their work. With their highly trained workers and their improved physical facilities our colleges are now able to attract an increasing number of welcome research grants from individuals, industry, and Foundations.

Pharmacy has improved much over the years, but with all the changes it has not become depersonalized. Nor will it. It is still, in part, an art learned by internship. There are some things the college will not and indeed cannot teach, skills that should be developed by a preceptor. But, today, most of the pharmacist's knowledge and much of his technical proficiency comes from the college. This makes especially important the fact that pharmaceutical education is now definitely on the march.

Everything in pharmacy and pharmaceutical education is not yet as the educators would have it. Undoubtedly it never will be. Educators deplore, for example, the excessive and unrestrained commercialism that is all too evident in certain districts. We assure you that it is not a reflection of the college

teaching. And while we condemn it, we point out that even if pharmacy today is apparently more commercial than it ever has been, it is at the same time more highly professional. The public has never received better, or safer, or more convenient, or more economical pharmaceutical service than it enjoys today. The members of the related health professions have never been better served.

Now, once more, the educators have raised their sights. The colleges plan through their newly expanded and enriched programs to give their students a more liberal education while they fit them for their professional responsibilities. They want their graduates

to have a broad enough range of fundamental information that they can think independently and creatively in fields other than pharmacy. Pharmacists should have cultivated interests and an appreciation of the finer things of life. The colleges hope to graduate not only competent pharmacists, but good-living persons and actively patriotic citizens, capable thinkers, men and women with disciplined minds.

No one knows how well they will succeed. We feel, however, that all that pharmaceutical education has accomplished in very recent years justifies a large expectancy of the future. We think you will agree.



MASS SPECTROMETER at the Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D.C., separates two or more radioactive isotopes of an element and computes the ratio of one isotope to another.

Inspecting the equipment are: (L. to r.) MAJ. GEN. GEO. E. ARMSTRONG, Surgeon General, U. S. Army; DR. FRANK E. BERRY, Assistant Secretary of Defense (Health and Medical); and COL. JOHN R. WOOD, Commandant of School.

Research in the Field of Accidental Trauma*

By

ROSS A. MCFARLAND, PH.D., SC.D.†

I. INTRODUCTION: MAGNITUDE OF THE PROBLEM

THE loss of life and incapacity resulting from accidents are greater than from any known disease entity. Accidents are currently responsible for the deaths of some 100,000 persons annually in the United States. About 400,000 more are permanently disabled in some degree. Ten million people are injured each year in accidents to the extent of one or more days of disability.¹

Accidents have now reached such proportions in the problems of national health that, among the civilian population, accidents have replaced diseases as the leading cause of death in the age range 1-24 years, and are second in the age range 25-44 years. The majority of casualties in the services fall within this same age range. The fact that these victims are in the younger age groups, in contrast to those whose deaths are attributable to certain degenerative diseases, implies an enormous cost to the productive resources of the country in terms of "life-years" lost. Measurement of nothing but the fact that a death has occurred is less meaningful than the measurement of how much "life-time" has been lost permanently.

Accidental trauma is now a major problem in the Armed Services. During World War II, the U. S. Army, for the first time in its history, reported more deaths due to accidents than to disease. Every fifth death was related to non-battle trauma and every 18th to disease. In 1952, one accident cate-

gory alone, vehicular accidents, caused 45% of all deaths in the Army due to non-battle causes, and 62% of all deaths due to non-battle injuries. The deaths from just these accidents were more than deaths from *all diseases* by 61 per cent, and cost the taxpayers well over \$12 million paid out in government life insurance policies alone.²

The reviews of accidental trauma in the U. S. Navy and Marine Corps indicate that a very serious problem exists. Accidents rank first in the ten leading causes of man-days lost. This is approximately three times as great as the next most common cause, namely upper respiratory infections. Motor vehicle accidents formed about 25% of all admissions for injuries. Non-effectiveness because of motor vehicle accidents in 1953—366,000 sick days—represents the loss of a full combat battalion of Marines, or the Navy personnel necessary to operate three large destroyers. About 88 per cent of those killed or injured were on leave or liberty at the time, and over one-half were injured during week-end periods.³

The Air Force reports a similar situation. Accidents outweigh disease as a cause of death and non-effectiveness. Again, motor vehicle accidents are a prime factor, with 338,025 man-days lost in 1952 from this cause. Private vehicles and off-duty activities, as in the Navy and the Army, were chiefly involved, presenting special administrative problems. Approximately 2,100 service men are killed each year on the highways—most of these deaths occur while off duty.

II. ANALYZING THE CAUSES OF ACCIDENTS

While significant gains have been made in safety in industry and in transportation in the past quarter century, the absolute numbers of accidents remain high, and the fact of decreasing rates should not be permitted to obscure the epidemic proportions of accidental trauma among the civilian and mili-

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† Associate Professor of Industrial Hygiene, Harvard School of Public Health, Boston, Mass., and Director, Commission on Accidental Trauma of Armed Forces Epidemiological Board, Department of Defense.

tary populations of this country. Although some progress has been made as a result of research, it is clear that intensified efforts to identify the causes of accidental trauma are essential if further gains are to be made. An urgent requirement is a central concept within which the relationships between multiple factors in accident causation can be studied and clarified. The epidemiological concept which has been developed for the study and control of mass disease has been proposed as a framework within which research can be so integrated.

The program of the Commission on Accidental Trauma of the Armed Forces Epidemiological Board emphasizes research of this nature. Several investigations have been sponsored by the Commission and ways are being explored to initiate studies at various universities and research institutions.* Thus far the research program has stressed basic causes in the areas of (1) identifying traits of personality and behavior which lead to repeated errors, (2) defects in the design of equipment (human engineering), (3) injuries and fatalities resulting from vehicular crashes, and (4) mathematical studies of the various interrelationships of contributing causes in accidents.⁴

1. *The epidemiological approach to the study of accidents.* It is not generally appreciated that injuries, as distinguished from disease, may be amenable to the epidemiological approach, and that accidents follow some of the same biological laws as do disease processes. The distribution of accidents show geographic variations, seasonal changes, variations by age, by sex, and in respect to other parameters. Schulzinger, for example, has analyzed a large series of accidental injuries treated in the course of private and industrial practice over a period of years. Accidental injuries were seen predominantly to be an affliction of youth, with 50% in this

series occurring before the age of 25. The rate for the 20-24 year group is over twice that of the 40-44 year group. A consistent diurnal cycle was observed, with a low at 5 a.m. and a peak at 5 p.m. Accident types showed a high degree of regularity, with 80% occurring in falls, in aggressive behavior, in handling objects, involving foreign bodies, in motor vehicle accidents, and in stumbling over objects.⁵

The deaths and disabilities that result from accidents are a relatively fixed and regularly recurring health hazard of more or less constant pressure. They correspond in their behavior to the endemic pattern of infection that characterizes so many communicable diseases. Thus accidental injuries are seen to conform to basic biological laws and to result from the total forces involved in the competition between man and the environment. Consequently, it is proposed that "the answers to why and how accidents come to be what they are, to behave as they do, and to occur in the places they are found, are to be sought in the mass pathology of traumatic injuries as evidenced by modern communities."⁶

In emphasizing the epidemiological approach to research on accidents, a wholly utilitarian purpose is intended, that of permitting a more inclusive program of preventive action than has been possible from information collected in piecemeal fashion. The advantage stems chiefly from the particular concept of causation of the epidemiological method. In most accidents there are several causes, and analysis should involve consideration of the interaction of host, agent, and environment. The complex nature of causation is thus recognized, and a determination of the causes of accidents in terms of the interaction between characteristics of the host, of the agent, and of the environment, provides the basis for highly specific programs of accident prevention.

The epidemiological method can be applied not only to the study of accidental injury as a public health problem of populations, but can also be applied to accidents of a particular kind, or to accidents of a par-

* These studies are being carried out under the sponsorship of the Commission on Accidental Trauma of the Armed Forces Epidemiological Board and are supported by the Office of The Surgeon General, Department of the Army.

ticular group, e.g., aircraft accidents, or the accidents of children or refinery workers.

As in few other approaches to the study of accidents, contributions from specialists in diverse fields can be integrated into an effective program of control. In fact, interdisciplinary effort is a basic requirement, without which the interaction among accident causes cannot be analyzed adequately.

III. RESEARCH ON HOST FACTORS IN ACCIDENTAL TRAUMA

1. *Human characteristics in relation to accidents.* Many studies on the causes of accidents have indicated human failure of some kind or other as the chief cause. Much research has been devoted to the identification of characteristics of individuals which are related to the numbers of accidents they sustain. Such attempts form the bulk of research in the highway field. In general the results have been disappointing. A number of characteristics appear to be slightly related to over-all accident rates, none however at a level useful for prediction. For example, (1) transit operators having high or low blood pressure tended to have higher accident indices than those with more normal values; (2) low intelligence was associated with accident frequency in a large number of drivers studied in Connecticut; (3) youthful drivers have proportionately higher accident rates than do the middle-aged group. Factors of temperament and irresponsibility are assumed to be significant factors, rather than age per se.

Such findings point up the need for research which considers the relationship of specific human factors to other variables in the total accident setting. The use of general accident indices, for instance, obscures the probability that some characteristics are of more importance in certain situations than in others. Several illustrations can be given. (1) When accidental poisonings are analyzed by age, children 2-3 years old are shown to be the victims chiefly involved.⁷ Developmental data indicate this age period to entail much exploratory behavior in which a hand-to-mouth testing of environmental objects

and substances is prominent. Measures of control must hence be based on this characteristic of the host. (2) Similarly, when a group of drivers was divided into those with fatal accidents at intersections and those with non-intersectional accidents, the average visual acuity of the "intersection" group was found to be lower.⁸

2. *The factor of age.* It is widely assumed that older workers constitute a safety hazard in industry. Research in industry and transportation does not support this view. Highway studies clearly indicate that accident hazards are higher in the younger age group, with lower rates obtaining as about age 30 is reached. The same finding appeared in a study of the age of truck drivers in relation to accidents.⁹ Various investigations in industry have now indicated that youth and inexperience influence accident rates adversely, and that older, more experienced workers tend to have lower accident and sickness rates, though recuperation from injury or illness tends to be more protracted.

An important area of research, in this connection, is that of the effects of aging on skilled performance. Welford, in Great Britain, has approached this problem experimentally. A major finding is that workers are less able to meet the demand of working at high speed with increasing age.¹⁰ This is particularly true in situations which contain novel elements. When older workers are faced with highly paced work, they are apt to become muddled, while if left to work at a speed of their own choosing, skilled performance shows no deficit and may even exceed that of younger, less experienced persons. Errors, and hence accidents, among older workers can be avoided when training and supervision take cognizance of the host factors which reflect the normal process of aging.

3. *Characteristics of accident repeaters.* A few years ago unusual susceptibility to accidents, or accident proneness, was advanced as the explanation of the bulk of accidents. Present indications are that the group of accident repeaters who might be so classified is very small. Recent research has supplied

promising methods for the detection of such individuals on an objective basis. Tillman studied accident repeaters among drivers,¹¹ and Wong among industrial workers.¹² These authors concluded that a man works, or drives, as he lives. Repeated accidents occur as "errors" in adapting to responsibility and the demands of life along with other manifest errors of adjustment. On such objective indices of poor adjustment as a history of contact with credit agencies, courts, and social agencies, accident repeaters contrasted strongly with those who were accident-free. These findings were confirmed in an application of the method to truck drivers in a study at the Harvard School of Public Health.¹³ An attempt to translate the method into an objective scoring system resulted in a promising degree of accuracy when applied in a subsequent sample of accident repeaters and accident-free truck drivers. Of interest also is a study of fatal ground accidents among USAF personnel. Biographical material in line with the Tillman concept proved capable of differentiating those accident victims who were judged primarily responsible for their own accidents from those where the responsibility belonged more to the situation.¹⁴

4. *The influence of temporary states and conditions.* It is recognized that factors which reduce human efficiency temporarily are also important in the complex of causes of accidents. The role of fatigue in aircraft accidents can be taken as an example.

It might be expected that the greater the number of hours a pilot has been flying, the greater the likelihood that he would be fatigued and therefore susceptible to accidents. A check of the 59 fatal accidents that occurred in domestic airlines from January, 1938, through December, 1949, however, failed to reveal any correlation between these accidents and the pilot's period off duty before the accident, his total time on duty in the last 24 hours, or his flying time in the last 24 hours. About 40 per cent of the accidents occurred within one hour after take off, about 40 per cent happened during the winter months, and approximately 70 per cent took

place at twilight or at night.¹⁵ While 59 is a small number of accidents for statistical appraisal, the inference is clear that fatal accidents result from the interrelationship of such factors as difficulty in take-off, winter weather, and poor visibility rather than from pilot fatigue per se. In fact, only a few major accidents in scheduled air transportation have been attributed to pilot fatigue as probable cause.

Somewhat more complete data are available from military operations. The records of the RAF Bomber Command on landing accidents for which flight duration was known was analyzed by Hill and Williams.¹⁶ Forced landings, and landings resulting from enemy action were excluded. The observed accident rates were compared against the rates expected if increasing duration of flight had no influence. The landing-accident rate was relatively high for flights under 2 hours and for those more than 10. Unfavorable developments associated with the return of the aircraft due to bad weather or technical difficulties were believed to underlie the high rates for the brief sorties, with the influence of fatigue more clearly seen in the higher rates for the flights which lasted more than 10 hours.

The extensive experimental literature on fatigue, both in respect to aviation and other situations, has limited application for the pilot whose duties are largely a matter of mental work and coordination, involving the central nervous system and seldom requiring the expenditure of energy in the use of gross musculature characterizing many other kinds of work. More pertinent is the concept of skill-fatigue, as developed from the "Cambridge Cockpit" studies on pilots.^{17, 18} A large number of military pilots were studied under simulated flying conditions by means of a standard cockpit, with full controls and instruments. Although maneuvering errors due to misuse of the controls decreased steadily throughout the experimental period, this improvement was more than offset by a deterioration in accuracy of timing and skill. As the subjects became more fatigued, they were willing to accept lower standards of

accuracy and performance. Furthermore, they failed to integrate the instruments as a unit, paying more attention to one or the other individually. The range of attention was diminished and loss of memory for peripheral instruments was common. Possibly the most significant finding for air transport pilots was the general tendency for a sudden increase in errors at the end of a flight. A tired airman has an almost irresistible tendency to relax when he nears the airport. This finding is believed to have significant implications in air transport operations since many accidents are associated with landing or the final stages of a flight.¹⁵

Individual differences in the ability of pilots to withstand the effects of fatigue is another important variable. A follow-up study was made of the accident records of 346 pilots who took part in the Cambridge Cockpit studies. They were classified into three groups according to the extent to which they showed disorganization of skill in operating the Cockpit. The pilots in the group with the least deterioration subsequently had one accident in 5,305 hours of flying. Members of the next group had a record of one accident in 4,578 hours of flying, and the pilots in the poorest group had one accident in 399 hours of flying. The accident rate for this last group was thus 12 times as great as for the pilots most resistant to fatigue. When only non-fatal accidents were considered, the poorest subgroup again contributed the greatest number of accidents.¹⁶

Temporary emotional states resulting from conflict and frustration may also contribute to accidents. Preoccupation with personal problems is believed to be a major hazard on the highway and in industry. This conclusion comes from dramatic instances in all forms of transportation. Further research is needed to develop methods of alerting operators when such situations prevail.

It is well known that accidents may result when the physiological functions of the body are altered by alcohol, excessive smoking, and overeating resulting in sleepiness.¹⁶ The influence of self-medication, with preparations

obtained over the counter, often includes side-effects which adversely influence performance and safety.¹⁹

IV. RESEARCH RELATING TO HOST-AGENT RELATIONSHIPS IN ACCIDENTAL TRAUMA

A promising approach to the prevention of accidents relates to a closer integration of the engineering and biological sciences in the development of equipment. This is often referred to as human engineering. The primary objective is to design equipment in terms of biological and psychological characteristics of the operators. Unless this is done it is hardly fair to attribute so many accidents to human failure as is usually the case.²⁰ In terms of our epidemiological analogy, the agent, i.e., equipment or vehicle, must be considered in its relation to the host, i.e., the operator.²⁰

1. *The role of faults in design and operation of equipment.* Many accidents are known to result from defective design. A good illustration may be drawn from the confusion arising when controls for operating the flaps and landing gear of aircraft are too close together or reversed from one plane to another. Inattentive manipulation or mistaken identity resulted in 547 aircraft accidents in one of the services during a 22-month period, January, 1943, to November, 1944, of which 273 occurred in advanced trainers and 184 in fighters, bombers, and transports.⁸ This occurred several times on the airlines and one such accident has involved one of the outstanding test pilots of the country.

Studies made on confidential reports of near-accidents and critical situations revealed that confusion of controls comprised 34 per cent of the specific errors described by airline pilots, and 50 per cent in the case of military flying. Two other types of errors were reported, one involving moving the control in the wrong direction, and the other, the inadvertent activation of a control. The inability to reach a control was also cited. Similar studies have been made of errors that pilots made in reading aircraft instruments.²¹

2. *Advance analysis of equipment.* The control of host-agent relationships for safety is approached through the application of the principles of what has come to be called human engineering. A considerable body of information has now been accumulated which permits the advance analysis of equipment for design faults which reduce efficiency and safety through neglect of human characteristics. If defects are present, it is only a matter of time before some pilot, worker, or driver "fails" and has an accident.

Advance analysis assumes the following considerations: (1) an operational job analysis is required, including a survey of the nature of the task, the work surroundings, the location of controls and instruments, and the way the pilot performs his duties. (2) A functional concept of accidents is implied; that is, the errors are anticipated that may occur while operating the equipment. (3) Human limitations as well as capabilities must be considered. It should be assumed, for instance, that no airman is a perfect pilot. He may actually be far below the ability adjudged by the engineer. If his duties are too complex the cumulative burden is great, and the limits of attention and ability are exceeded. (4) Finally, a wide margin of safety should be provided to eliminate any possible situation that places the worker near his maximum ability with respect to aptitude or effort, especially when adverse factors enter the picture.²⁰

A few illustrations may be taken from the vehicular field. In a study carried out at the Harvard School of Public Health, an evaluation was made of several recent models of trucks and buses.¹⁸ A number of defects were found which have direct implications for safety, comfort, and efficiency.

a. Some defects involved a failure to consider the range of the body size of the drivers. In terms of over-all working space, one model was adequate for only the smallest 40% of drivers. In several models only 5% of drivers could comfortably reach and operate the hand brake. In others, only 60% could be accommodated for knee-height be-

tween pedals and steering wheel. Fore and aft seat adjustments were inadequate for the variation in size among drivers, and vertical adjustments were usually not provided.

b. The design of windshields and side windows presented serious problems for adequate vision from the cab. Inadequate provisions for cleaning and defogging added to these problems.

c. Frequent errors were observed in the location and design of switches for headlamps, fog lamps, and marker lights. In two instances the dimmer switch was located directly beneath the foot pedals, thus fostering (1) inadvertent operation of air horn or fog lights while attempting to activate the dimmer switch, and (2) longer reaction time while avoiding the pedals.

d. Instruments were not located with respect to visibility. In several cases the air gauge was directly in front of the steering wheel and could not be seen without twisting out of the normal driving position. The RPM indicator, in some models, was placed at the extreme right of the dashboard, making accurate reading virtually impossible.

A considerable body of information has now been accumulated which permits the more effective integration of men and machines. Specific criteria have been developed which can be applied (1) in the design and arrangement of the visual and auditory displays from which the operator takes his cues, (2) in the design and location of controls for maximum accuracy and ease of operations, and (3) for seating and layout with reference to human size and bodily mechanics. A few examples may be given—(1) when a panel of dials is to be checked, deviations will be more quickly and accurately perceived if the "normal" position of all pointers is the same, e.g., at 12 o'clock; (2) fewer confusions or inadvertent-operation errors occur when the knobs of adjacent controls are shape-coded; and (3) levers which require accurate reading and positioning should be in front of, and not above, the shoulder height of the operator.

3. *Crash injury research.* An important

area of research which is now being conducted in the field of accidental trauma relates to the protection which might be provided for the occupants of various types of equipment in sudden deceleration or crashes. Many of the injury-producing agents in aircraft have been identified by DeHaven, and the Commission on Accidental Trauma is now sponsoring an extensive project at Cornell University in the automotive field.²² The effective cooperation of state highway officials, medical societies, and public health agencies in collecting accident data is very encouraging. Accurate field reports should provide information on items such as: disfigurements caused by windshields, the effectiveness of pop-out windshield installations, protective effects of "turret" type tops, the danger set up by "tin foil" tops in roll-over accidents, the frequency of serious or fatal injury resulting from inadequate door latches, dangerous steering wheels and instrument panels.

The tolerances of the human body to extreme deceleration are being established through the basic researches of Col. John Stapp of the USAF and the Cornell Aeronautical Laboratories.²³ The NACA is also contributing to this field through their investigation of aircraft crashes. Similar studies are being undertaken at the Holloman Air Force Base on automobile crashes. These studies offer great promise in reducing the severity of injuries on the highways as well as in combat.

V. RESEARCH ON HOST-ENVIRONMENT RELATIONSHIPS IN ACCIDENTAL TRAUMA

The effective control of accidents must consider the environment in relation to the characteristics, capabilities, and limitations of the host. It is possible that these interrelationships can be more adequately described through the use of mathematical models, and advanced statistical procedures. The Commission on Accidental Trauma of the AFEB has sponsored the studies of Dunlap and Associates in this field. Their theoretical and experimental findings are now being applied

to the understanding and control of accidents in various military establishments.⁴

Environmental influences which may effect the operators of various types of equipment are fairly well understood if considered as single variables. For example, if noise levels exceed certain limits, speech communication may be impaired, and safety compromised. Substitute signals may be misunderstood, except in highly trained subjects. Unfortunately, environmental influences usually are complicated by a series of variables, and are interdependent with the individual host and agent.

The difficulty of using a single numerical value may be illustrated by referring to the effects of carbon monoxide on pilots. The generally accepted standard is 0.005% carbon monoxide in circulating air. This figure may be satisfactory for a person sitting quietly at sea level, but it should be reduced if the amount of exercise, degree of ventilation, or the length of time increases. If the pilot is a chronic cigarette smoker, there may already be 5 to 10 per cent CO in his blood. In flight his physiological altitude may be materially increased by the combined effects of the ambient CO in the aircraft, the CO from smoking and the lowered amount of oxygen available at high altitude. The same complexity characterizes almost every other environmental variable.¹⁵

1. *Visibility at low levels of illumination.* The importance of the reduced visibility resulting from lower illumination levels is seen in the greater accident rates on the highways during the hours of twilight and darkness. In 1953 fatal accident rates per 100 million vehicles miles were approximately three times greater at night than during daylight hours.¹

A study of Air Force accidents in 1948 indicated that, for all types of planes, accident rates for night flying were approximately one and one-half times greater than for daytime. Another study investigated night accidents of Navy pilots in training, relating accidents to the phase of the moon. Accidents during the full moon were significantly few-

er than at the time of the new or half moon. This was especially true in accidents involving low approaches and disorientation.²⁴ Fatal accidents in civil airlines between 1938 and 1949 tended also to occur during the hours of twilight or darkness.

Another illustration may be given from the field of automotive windshield design. A new glass has been developed for use in cars to reduce glare. It causes about 30 per cent absorption of light as opposed to the 12 per cent level of absorption of ordinary safety glass. Drivers in the older age groups will be especially handicapped, since their light sensitivity is already markedly reduced at low illumination at night. This suggests that the American Standards Association code on glazing for auto windshields should include some measure of the effect of the glazing on operator visibility. The glass may meet code standards but does not seem to meet human requirements at all times.

2. *Temperature and humidity.* Other physical variables influencing efficiency and safety are temperature and humidity. Extremes of these factors will result in discomfort and lowered efficiency. For each of these variables there are reasonably well-defined ranges of comfort and discomfort, and the design of equipment should take these into account as far as possible.

The effect of thermal stress on accident rates has been shown in at least three classes of work. (1) The accident rate among mine workers bears an orderly relation to temperature. Near 60°F accidents were at a minimum, with increases of two- to three-fold at temperatures approximating 80°F. (2) Studies in British munitions factories show that both cold and heat stress increase the frequency of accidents in manual operations. Accidents were at a minimum at 67°F and increased above and below this temperature. The 35% increase noted at 50°F is assumed to be an effect of chilling on manual dexterity, while that at the higher temperature is attributed to decreases in general alertness and to increased physiological stress of uncomfortable heat. (3) Highly practiced habits

of a skilled character involving minimal physical exertion are influenced adversely with humid, high temperature. In a study on wireless operators errors increased from an average of 12 per hour to more than 90 per hour as Effective Temperature was increased from 79° to 97°F.²⁵ In the sense that errors in skilled acts are accidents, such data are convincing evidence of the deleterious effect of heat stress on human adjustment.

3. *Role of the social environment.* Another aspect of the influence of environment in safety relates to social forces. Socially determined attitudes are widely quoted as important in highway accidents, but such factors have received little experimental study. It has been demonstrated in industry that accidents are more frequent when morale is low, and under certain types of supervisory practices. High accident rates were found to follow such a supervisor when transferred over another group.^{26,27} A recent study of army motor units presents some interesting differences in personnel practices between units rated high or low in safety.²⁸ This is an area which has only begun to be studied.

VI. THE CONTROL OF ACCIDENTS IN THE ARMED SERVICES

All of the military services have found it necessary to institute programs in highway safety. An example is the comprehensive program recently adopted by the U. S. Marine Corps.²⁹ This program requires the establishment of a Safe Driving Council at each base. All personnel on active duty must receive a minimum of four hours of instruction on highway safety, and reservists receive at least two hours. This instruction emphasizes the psychological and operational aspects of vehicular accidents. In addition, all personnel are indoctrinated by means of films, lectures, poster, articles, and special displays or exhibits. Traffic engineering systems have been established at each base in order to assist in the elimination of hazardous highway conditions. Finally, a system of law enforcement has been instituted at each base, including the specification of limits of travel for week-end

passes. All of the services are experimenting with a plan to terminate week-end liberties at 1300 on Monday rather than at the beginning of duty in the morning. This may tend to eliminate much of the high speed, late-at-night driving which has been responsible for many of the off-duty service accidents.³

A detailed analysis of 707 automobile accidents involving military personnel at Camp Lejeune, N.C. during 1951 has been made by the Naval Research Laboratory.³⁰ The privates, privates first class, and corporals had more accidents in proportion to their number. Analysis by time and place suggested certain possibilities of control, such as intensification of patrol at the close of leave and liberty periods. Certain differences between the findings for this particular establishment and the findings representing the experience of the Navy as a whole pointed up that control practices should be related to the particular problems of each base.

An analysis of accidents and of the development of a preventive program may be found in a report on sports accidents in the USAF.³¹ In 1953, sports formed the second ranking source of all ground accidents, producing 17% of all the injuries suffered by Air Force personnel and resulting in 84 deaths and 39,773 man-days lost. Analysis of accidents and injuries by place, nature of injury, and person provided cues as to causes. For instance, in basketball, the injuries were predominantly sprains and fractures occurring to the legs while jumping, sliding, tripping, twisting, and falling. Equipment was not found to be a significant factor. Three chief "causes" emerged from this analysis: lack of proper physical condition, lack of knowledge of how to fall, and poor officiating. A program was developed to reduce athletic injuries based upon: (1) a program of physical conditioning, (2) improving officiating, and (3) proper training in working methods of the game.

VII. SUMMARY AND CONCLUSIONS

The control of accidents falls within the province of preventive medicine and public

health as do such fields as industrial hygiene and sanitary engineering because of the important role played by human variables. It is not generally appreciated that injuries, as distinguished from disease, are also amenable to the epidemiological approach, and that accidents follow some of the same biological laws as do disease processes. In most instances there is multiple causation, and analysis and control should involve consideration of the interaction of host, agent, and environment. Although the host is of primary medical concern, the agent and environment must be considered in effective preventive measures. This applies equally to military and civilian populations, under all circumstances, including combat.

A first step is to set forth the basic physical, physiological and psychological characteristics of the host. When such facts are associated with the agent under given environmental conditions and at specific times and places, information can be obtained so as to understand and prevent accidents.

It was shown that one of the most important ways of improving safety is to design equipment in terms of human capabilities and limitations. This is the special province of the human engineer. Equipment for human use must be designed on the basis of an understanding of the sense organs and characteristics of human perception, and of human capabilities and limitations in the operation of controls. This understanding must extend to situations of operating under temporarily impaired efficiency, as with fatigue, and of environmental conditions normally encountered, and the more unusual situations of special stress. The advance analysis of equipment in these respects should result in fewer accidents.

Additional factors influencing efficiency and safety relate to the physical variables in the environment. For each of these there are reasonably well-defined ranges of comfort and discomfort, and ranges where efficiency is reduced to the detriment of safety.

Factual information of the types basic to such an approach can be discovered only by carefully controlled experimental studies, epi-

demographic surveys, and statistical analysis. A dynamic and continuous safety program can produce positive results only by the constant application of the fundamental principles resulting from such studies.

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Cost of Accidental Trauma in the Armed Forces*

By

COLONEL THEODORE C. BEDWELL, JR., USAF (MC)†

(With one illustration and four charts)

THE preservation and maintenance of the health of military personnel has, for many years, been the primary mission of the military medical services. The discipline so necessary to the successful pursuit of military operations, has always been readily adaptable to the application of the prevention and treatment of diseases and injuries incident to military life. Certain highly successful preventive medicine procedures have been developed through the years that are exemplified by the program of immunizations and the sanitary control of food, water and the environment.

We in the armed forces are now faced with a most difficult and complex situation in that the increasing number of cases of traumatic injury from accidental causes is posing a serious threat to the over-all effectiveness of our military forces.

Service personnel have one of the worst accident records of any group in the nation. Automobiles driven by young servicemen are "an undesirable insurance risk." Military personnel are involved in about one out of every thirty fatal accidents in the United States! Yet servicemen and women don't add up to nearly 1/30 of the total population—nor do they drive even one out of each 30 miles driven in the nation.¹

While motor vehicle accidents are the major cause of off-duty deaths and injuries in the armed forces, other types of accidents also account for a considerable number of off-duty casualties each year. Off-duty accidents are the most important accident problem facing the armed forces. Strangely

enough, these mishaps befall the same men and women who—day after day—cope successfully with far greater risks while on their jobs.

The terrific cost of injuries and fatalities in armed forces personnel cannot be measured accurately in dollars and cents. Merely taking the \$10,000 Government life insurance policy which was paid to the beneficiaries of the 3,657 accidental deaths in the armed forces during 1953 contributed the sum of \$36,570,000 to the total cost of these accidents.

The cost of accidental trauma, even with broad imagination, cannot be measured by loss of manpower alone, since equipment and material in many instances are quite costly.

In attempting to analyze the many factors which play a part in the causation of accidents certain ones stand out as most important.

We must consider the accident victim. The age group of military personnel experiencing the greatest proportion of accidents is between the ages of 20 to 29 years. This 60% group experiences approximately 75% of accidents involving surface transportation, 90% of athletic injuries and well over 90% of the remaining traumatic injuries. There are a few outstanding characteristics of this age group that may contribute to their accident picture. These may be expressed as impulsiveness, unwillingness to accept restraint, exuberance, willingness to take chances, skepticism, and occasionally deliberate antagonism to discipline and routine. Such individuals, when under the regimentation of military life are extremely prone to over-compensate in rashness of action, when placed in a situation while off-duty that may be harmful to themselves or to society in general. When alcohol enters the picture, the situation is obviously aggravated.

From the standpoint of the environment

* Presented at the 61st Annual Convention of the Association of Military Surgeons of the United States, held at Hotel Statler, Wash. D.C., Nov. 29-Dec. 1, 1954.

† Chief, Preventive Medicine Division, Directorate of Professional Services, Office of the Surgeon General, U. S. Air Force, Wash. D.C.

to which the individual may be exposed while on-duty, we may consider that for every hazard of duty or recreation on-base, there exists a larger number of safeguards and restrictions than may be found off-base. This applies particularly to traffic regulations and enforcement with the consequent low traffic accident rates experienced on-base compared to those off-base.

By way of explanation the standard injury and fatality costs used for evaluating the over-all cost of air force ground accidents, the following criteria are used:

INJURY CLASSIFICATION

Air Force Military Personnel

	Temporary	Permanent	Permanent	
Nondisabling	Total	Partial	Total	Fatal
\$7.00	\$30/day	\$43,000	\$63,500	\$31,500

The following tables, graphs and figures portray the available data on the cost of accidental trauma to military personnel in the armed forces during 1953, exclusive of injuries due to aircraft accidents. Data on the cost of accidental trauma to civilian employees is not covered.

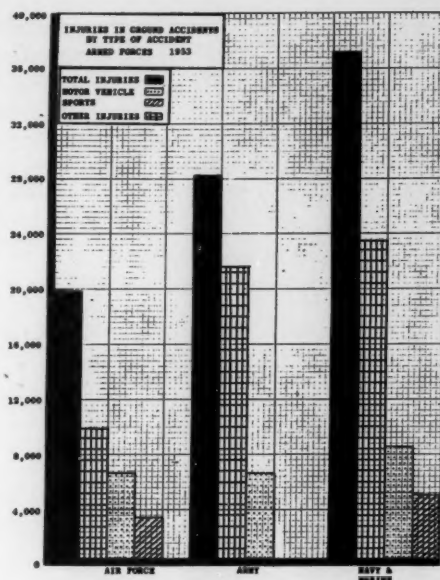
Table 1 gives a breakdown, by type, of ground accidents in the Air Force, Army and Navy.

TABLE 1

1953—U.S. ARMED FORCES INJURIES IN GROUND ACCIDENTS—By Type

<i>Air Force</i>		
Total		19,942
Other		9,648
Motor Vehicles		6,830
Sports		3,464
<i>Army*</i>		
Total		28,451
Other		21,646
Motor Vehicles		6,805
Sports		(Not Separated)
<i>Navy—Marines</i>		
Total		37,306
Other		23,537
Motor Vehicles		8,488
Sports		5,281

* Excluding Korea and includes aircraft accidents.



GRAPH 1.

Graph 1 portrays the same information contained in Table 1, but in graphic form.

Figure 1 portrays the number of man days lost in each service.

Graph 2 shows a comparison of admission rates for injuries and disease in each service.

Graph 3 shows the number of injuries for each service as well as the total.

Graph 4 shows the number of fatalities for each service as well as the total.

Table 2 gives a summary of the Armed Forces accident experience for 1953.

In other words, we can sum up the 1953 accident experience as follows:

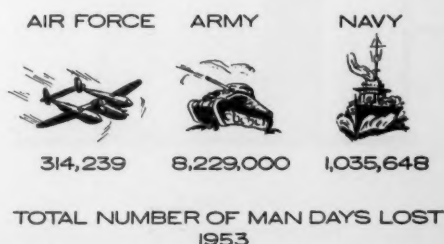
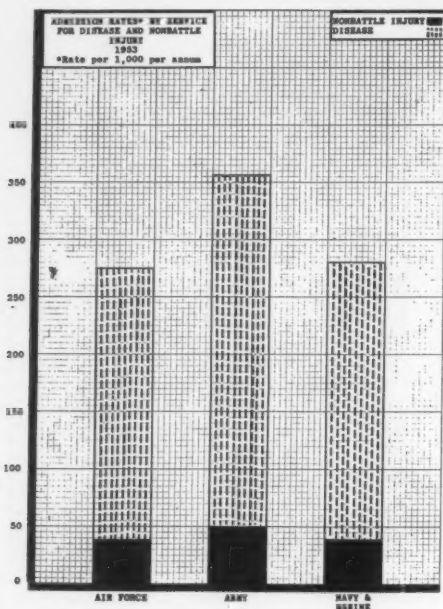
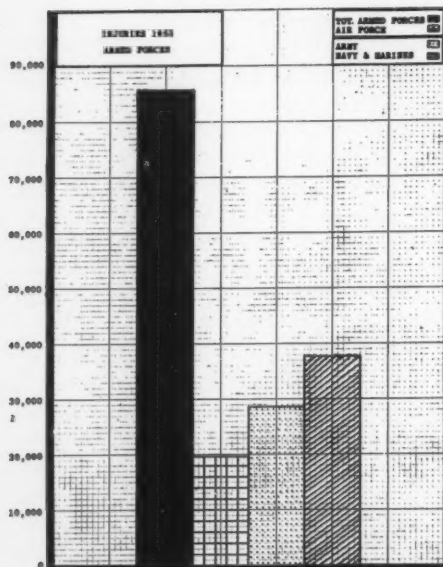


FIG. 1.



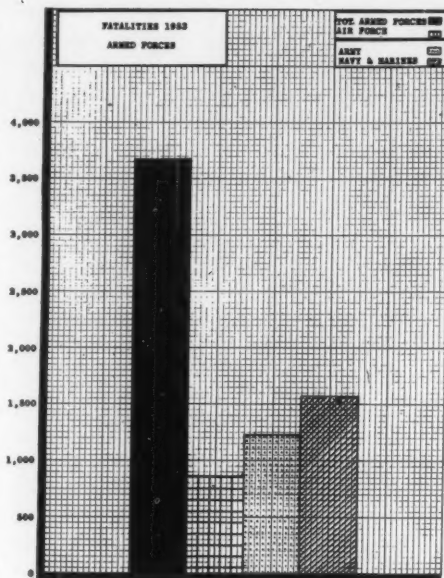
GRAPH 2.



GRAPH 3.

AIR FORCE

During 1953, 856 Air Force military personnel died as the result of ground accidents. There were 19,942 disabled. A total of



GRAPH 4.

314,239 man days were lost. Altogether, these accidents cost the government approximately \$41,000,000—not including the value of equipment destroyed or damaged in the accidents. These records show that an accident involving Air Force personnel, equipment or property occurred every ten (10) minutes during 1953. There was one (1) non-fatal injury to Air Force personnel each thirty (30) minutes, one (1) death for each ten (10) hours and a total loss to the government of \$84 per minute.

NAVY AND MARINE CORPS

Figures for 1953 show that in the Navy and the Marine Corps, together 37,306 persons were admitted to the sick list because of accidental injuries. Of this number 1,565 persons died. These accidental injuries cost the two (2) services a total of 1,035,648 lost man days.

The Navy does not compute accident cost to the Government.

ARMY

Figures compiled by the Army for 1953 indicated that 1,236 soldiers died in accidents

TABLE 2
1953 ARMED FORCES ACCIDENT EXPERIENCE SUMMARY

	Air Force	Army ^a	Navy and Marines	Total
Total number of military personnel injuries	19,942	28,451	37,306	85,699
Total number of military personnel fatalities	856	1,236	1,565	3,657
Total number of man days lost	314,239	8,229,000 ^b	1,035,648	9,578,887
Property damage costs	\$3,248,637	— ^c	— ^c	3,248,637 ^f
Direct cost of injuries (military personnel)	\$40,949,041	54,903,000 ^d	— ^e	95,852,041 ^f

^a Excludes Korea.

^b Based on preliminary 1952 estimates of days lost per injury and standard fatality charge.

^c Army does not separate military property damage.

^d Includes direct federal costs including V.A. insurance and disability retirements.

^e Navy and Marines do not estimate cost per injury or property damage costs.

^f Total Air Force and Army.

throughout the world (excluding Korea). A total of 28,451 were disabled in accidents. The Federal Government paid out \$54,903,000 to care for the injured and the survivors of the dead, an average direct cost of \$1,930 per injury. During the year accidents resulted in disabling injury to one (1) of each fifty-three (53) of the military strength, one (1) of each 965 being fatally injured.

In conclusion it is apparent that the actual cost of the accidental trauma in the Armed Forces is greater than it need be. The price

we are paying in the intangibles of grief and suffering of families and replacement of trained individuals in the military services cannot be measured accurately in dollars and cents. It is imperative that every possible effort be continued toward the goal of reducing the number of traumatic injuries in the Armed Forces as well as in the civilian population in general.

REFERENCE

¹ Armed Forces Talk Number 426, "Your Safety," 14 November 1952.



Injuries Incurred in Aircraft Accidents*

By

COLONEL H. G. MOSELEY, USAF (MC)†

THE emergence of air power in World War II caused definite basic changes in the concepts of warfare. Similarly, the use of aircraft by both the military and civilians to solve the daily problems of communication and transportation is causing almost revolutionary changes in the boundaries of human enterprise. Therefore, it is not surprising that medicine, and particularly military medicine, is the recipient of considerable challenge from this lusty new creation of man's inventive mind.

Aviation medicine is, of course, medicine's method of engaging this new problem. And, because of the complexity of medical problems inherent in man's conquest of the air, aviation medicine has become as distinct an endeavor as surgery, pediatrics, industrial medicine, or any other specialty wherein an individual's predominant effort becomes devoted to a facet of the art.

However, one phase of medical responsibility to aviation which is not confined to aviation medicine and which may confront the military or the civilian physician, and the general practitioner and specialist alike, is the treatment of those who become injured in aircraft accidents. In this respect, it is becoming increasingly more important to know what type of casualty might be expected in order that both our understanding and our armamentarium may be prepared for the sudden emergency of an aircraft accident.

In order to gain insight into the aircraft injury problem all aircraft accidents which occurred in the USAF during the three-year period of 1 January 1951 through 31 December 1953 have been analyzed, and the injuries received by occupants tabulated. Also in or-

der to give indication as to what might be expected in (1) high performance aircraft, (2) commercial aircraft, and (3) average military aircraft, the injuries have been further broken down into three general categories: namely, (1) injuries received in the jet fighter category which includes jet fighters, jet interceptors, and jet trainers; (2) those received in the transport category which includes both personnel and cargo type aircraft, and (3) injuries incurred in all other USAF aircraft which includes non-jet trainers, bombers, helicopters, and so forth. With the exception of a few jet bombers, this last category is comprised of conventional aircraft with one or more reciprocating engines. Table 1 lists the total accidents for the period covered, the number of personnel involved, and the category of aircraft which the individual occupied.

TABLE 1
TOTAL MAJOR AIRCRAFT ACCIDENTS AND TOTAL PERSONNEL INVOLVED BY AIRCRAFT CATEGORY, 1 JANUARY 1951-31 DECEMBER 1953

Total Major Aircraft Accidents.....	6,531
<i>Total Personnel Involved</i>	
<i>Aircraft Category</i>	<i>Involved</i>
Jet fighter ¹	3,715
Transport ²	6,124
All others ³	8,455
Total Personnel Involved.....	18,294

¹ Includes jet fighters, interceptors and trainers.

² Includes personnel and cargo aircraft.

³ Non-jet trainers, bombers, helicopters, etc.

Although the treatment of major non-fatal injuries requires the predominant medical effort subsequent to an accident, a brief review of fatal injuries is pertinent (Table 2). During the period of this study there were 3,050 fatal injuries. The majority of these fatalities were due to multiple injuries, a description which ranges from two or more primary injuries each of which would be

* Presented at the 61st Annual Convention of the Association of Military Surgeons of the United States, Hotel Statler, Washington, D.C., Nov. 29-Dec. 1, 1954.

† Chief, Medical Safety Division, Office of Inspector General, USAF, Norton Air Force Base, San Bernardino, Calif.

TABLE 2

PRIMARY FATAL INJURY TYPES SUSTAINED IN USAF
MAJOR AIRCRAFT ACCIDENTS, 1 JANUARY
1951-31 DECEMBER 1953

Multiple injuries	1,708
Missing	488
Skull fracture (with cerebral injury).....	307
Burns	194
Extreme localized trauma.....	70
(Decapitation, crushing of thorax, etc.)	
Brain concussion without skull fracture. . .	60
Drowning.....	45
Spinal cord injury.....	13
Injury to liver, spleen, lungs, heart or aorta	11
Complications of burns and injuries.....	10
Shock.....	5
Asphyxia and exposure.....	4
Hemorrhage (severance of external carotid)	1
Unknown.....	134
Total Fatalities.....	3,050

fatal, to conditions of extreme disintegration. Fatalities listed as missing are predominantly cases which were lost at sea. The cases listed as unknown comprise a small category where the type of fatal injury was not reported due to technical difficulties. When these two latter categories were excluded from the total it was noted that multiple injuries comprised 70% of the fatalities and other less traumatic injuries accounted for 30 per cent. This brings into focus the nature of the trauma encountered. Roughly, aircraft accidents can be divided into two categories, depending upon the magnitude of forces encountered. In one category of aircraft accidents the decelerative, explosive, or other forces are extensive, ordinarily leading to disintegration of the aircraft and extreme trauma to the occupants. This type of force is encountered when an aircraft strikes an unyielding object with high velocity. In such accidents protective equipment is of doubtful value and survival is due to happenstance. The other category of aircraft accident is that wherein decelerative or traumatic forces are moderate, such as when the aircraft strikes the earth at low velocity or at a low tangential angle. The majority of the 720 fatalities due to single primary causes occurred in the non-disintegrating type aircraft accident. Many of these fatalities might

have been prevented had available protective equipment been used or had more adequate protective equipment been provided. Fatalities due to cerebral injury in particular, fall into the possibly preventable category. Of some interest is the fact that of the 3,050 fatalities encountered during the period studied, only 52 died while under hospital treatment. This, again, indicates the rather narrow boundary line between survivable and non-survivable accidents. Also of interest is the almost negligible number of fatalities which was due to rupture of an internal organ or viscus, and to shock.

TABLE 3

TOTAL MAJOR INJURIES AS TO TYPE, 1 JANUARY
1951-31 DECEMBER 1953

Fractures:		
Primary.....	422	
Secondary.....	231	
Total.....		653
Sprains—Dislocations:		
Primary.....	61	
Secondary.....	60	
Total.....		121
Surface Wounds:		
Primary.....	101	
Secondary.....	177	
Total.....		278
Burns:		
Primary.....	142	
Secondary.....	142	
Total.....		284
Miscellaneous:		
Primary.....	181	
Secondary.....	30	
Total.....		211
Total Major Injuries.....		1,547

Table 3 presents an analysis of major non-fatal injuries sustained during the period covered, with injuries broken down into broad categories. The 1,547 major injuries listed were encountered by 907 individuals, indicating that it was not unusual for a single individual to receive two or more major injuries in an aircraft accident. Tables 4 through 8 present a more detailed review

TABLE 4
FREQUENCY OF FRACTURES BY SITE OF INJURY AND AIRCRAFT CATEGORY,
1 JANUARY 1951–31 DECEMBER 1953

Site of Injury	Total	Jet Fighter	Transport	All Other Aircraft
Skull/face	63	10	10	43
Pelvis/sacrum	21	4	8	9
Upper extremities	88	21	19	48
Lower extremities	183	31	57	95
Ribs/sternum	41	8	14	19
Vertebrae	230	125	30	75
Clavicle/scapula	27	3	8	16
Total	653	202	146	305

of these injuries. Analysis of these detailed breakdowns indicates the following:

a. *Fractures* (Table 4) accounted for 42.2% of all major non-fatal injuries, and when combined with sprains and dislocations (Table 5), accounted for 50% of the total. Vertebral fracture was most common, accounting for 35% of all fractures, followed

in frequency by fractures of the lower extremities, skull and face, upper extremities, and various other regions. Fractures of the pelvis and sacrum were very infrequent.

In fighter aircraft, vertebral fractures were excessively prevalent, accounting for 62% of all fractures received by occupants of this aircraft category. In transport aircraft, frac-

TABLE 5
FREQUENCY OF SPRAINS/DISLOCATIONS BY SITE OF INJURY AND AIRCRAFT CATEGORY,
1 JANUARY 1951–31 DECEMBER 1953

Site of Injury	Total	Jet Fighter	Transport	All Other Aircraft
Face/neck	3	1	—	2
Thoracic, general	3	—	1	2
Abdomen/lumbar	14	4	1	9
Upper extremities	15	4	2	9
Lower extremities	64	12	12	40
Vertebrae	22	6	1	15
Total	121	27	17	77

TABLE 6
FREQUENCY OF SURFACE WOUNDS BY SITE OF INJURY AND AIRCRAFT CATEGORY,
1 JANUARY 1951–31 DECEMBER 1953

Site of Injury	Total	Jet Fighter	Transport	All Other Aircraft
Head/face/neck	97	21	22	54
Thorax	17	3	6	8
Abdomen/lumbar	5	3	1	1
Upper extremities	21	5	5	11
Lower extremities	36	4	7	25
Generalized	102	26	18	58
Total	278	62	59	157

TABLE 7
FREQUENCY OF BURNS BY SITE OF INJURY AND AIRCRAFT CATEGORY,
1 JANUARY 1951-31 DECEMBER 1953

Site of Injury	Total	Jet Fighter	Transport	All Other Aircraft
Head/face/neck	89	17	22	50
Thorax, general	4	2	0	2
Abdomen/lumbar	6	0	1	5
Upper extremities	85	17	15	53
Lower extremities	35	4	0	31
Generalized	65	14	10	41
Total	284	54	48	182

tures of the extremities were most prevalent, accounting for 52% of all fractures received by occupants in this aircraft category.

In all categories of aircraft the number of non-fatal skull fractures was relatively low. However, when fatal and non-fatal skull fractures are grouped together this type injury proved fatal in 83% of the cases.

b. *Surface wounds* (Table 6) accounted for 18% of the major injuries received. This type injury includes lacerations, abrasions, and contusions of sufficient seriousness to warrant five or more days' hospitalization, but does not include avulsions or amputations. Generalized surface wounds, which means the individual received three or more wounds, were most frequent, followed closely by wounds to the head, face, and neck. No

significant difference in frequency of surface wounds according to aircraft categories was noted.

c. *Burns* (Table 7) accounted for 18.4% of the total major injuries. The head, face, and neck were the most frequent sites, followed closely by the upper extremities and then by generalized areas. Eighty-four per cent of all burns were in these areas. Burns of the lower extremities and trunk accounted for only 16% of the total burns received.

d. *Miscellaneous wounds* (Table 8) accounted for 13.6% of the total injuries. The most predominant injury in this category was cerebral concussion. When fatal and non-fatal cerebral concussions are considered together, it is noted that 68% of the individuals with this injury as a primary diagnosis sur-

TABLE 8
FREQUENCY OF MISCELLANEOUS INJURIES BY TYPE, SITE OF INJURY AND AIRCRAFT CATEGORY,
1 JANUARY 1951-31 DECEMBER 1953

Type and Site of Injury	Total	Jet Fighter	Trans- port	All Other Aircraft
Cerebral concussion	128	31	34	63
Penetrating wounds	14	3	2	9
Pneumothorax (traumatic)	9	2	3	4
Rupture or contusion of kidney, bladder, lung or abdominal viscus, or artery	8	2	3	3
Exhaustion from exposure	7	1	0	6
Spinal cord injuries (degree of paralysis unspecified)	6	6	0	0
Amputations (traumatic)	3	1	0	2
Traumatic shock	1	1	0	0
Other	12	1	2	9
Unknown	23	1	7	15
Total	211	42	51	111

vived. In considering the remainder of miscellaneous injuries the figures are impressive by their insignificance rather than their magnitude. Of more than 1,500 major injuries there were only 14 penetrating wounds and only eight cases of significant internal injury. The 12 cases listed as "Other" include a variety of ill-defined conditions ranging from post-traumatic arterial thrombosis to tracheotomy to prevent suffocation. There was but one case wherein traumatic shock was reported as the primary diagnosis, although the seven cases of exhaustion from exposure might also be placed in the shock category. Although shock was certainly present in many cases it was unreported, and therefore must have been of minor magnitude.

The causes of injuries received in aircraft accidents are intimately allied to (1) the nature of the traumatic forces encountered, (2) protective equipment used, and (3) opportunity for escape from the aircraft. Concerning the first of these it is significant to realize that trauma is incurred either as a result of forces directed toward the body, or by the inertia of the body itself. In the former case, injury results from blows imparted by the seat or other aircraft structure, or by objects being hurled. In the latter, injury results when the body becomes subject to the laws of motion and is thrown, catapulted, or flailed as a result of abrupt deceleration of the aircraft. In many cases the exact causes of injuries are obscured or lost during the accident. However, the following review of injury types with the above points in mind, is relevant.

a. *Vertebral fractures*: The high number of vertebral fractures encountered in the jet fighter category was mainly due to the excessive forces encountered, coupled with limitations of protective equipment. Careful analysis of accidents producing such injury reveals that no single force factor was responsible. Many injuries appear to have been due to severe force directed toward the caudal aspect of the vertebral column when the aircraft slapped down or hit the earth with considerable velocity. In other accidents

there appear to have been very little force directed toward the individual, but there was marked and abrupt linear deceleration which resulted in the body being jack-knifed forward over the seat belt. In many cases a combination of both of the above factors may have been present. On occasions loose shoulder harnesses and failure of the inertia reels permitted the body to jack-knife.

b. *Fractures of the extremities*, which were prevalent in transport type aircraft, appear to have been caused mainly by body inertia with flailing of the extremities, and by flying objects. Lack of shoulder harnesses in such aircraft, as well as occasional failure to use safety belts, contributed to the number of injuries which were caused by body inertia.

c. *Skull fractures and concussion* were caused, in the majority of instances, by jack-knifing forward over the seat belt with the head striking the gunsight, instrument panel, or the control stick. The fact that a number of aircraft did not have shoulder harnesses installed, or that personnel were careless in their use contributed to this type injury. In addition, the normal elasticity of nylon, which is frequently used in the shoulder harness, and the failure to wear protective helmets, added to the number of skull fractures and concussion cases.

d. *Surface wounds* appear to have been the result of accidents involving less extreme deceleration or traumatic forces. In these cases contact with aircraft structures produced lacerations and abrasions rather than fractures or extreme injury. Possibly due to the relatively infrequent contact with glass there were very few exsanguinating type of lacerations.

e. *Burns*, almost all of which were caused by burning jet fuel products, were in many cases made more severe by lack of sufficient protective clothing. Burns of the upper extremities might have been prevented had gloves been worn. On occasions inability to escape rapidly from the aircraft materially contributed to the severity of burns sustained.

f. The last significant observation on injury causes is concerned with the low inci-

dence of internal injuries. When compared to the type received in automobile accidents, the percentage of survivors from aircraft accidents with ruptured intra-abdominal or intra-thoracic organs appears to have been quite small. The most probable explanation for this is that restraints which were used by occupants of aircraft prevented the body from being hurled unless the forces were so great that the restraints were overcome. In the latter cases, however, the injuries then ordinarily proved fatal. It is of interest to note that in spite of the fact that the body was often jack-knifed over a lap belt with extreme force, the lap belt itself did not appear to be an injury-producing factor except for vertebral fractures.

It is not the purpose of this paper to explore in detail preventive or remedial measures. However, the above findings suggest that injuries in aircraft accidents can be reduced by any mechanism which will decrease the forces transmitted to the body, especially that force transmitted by the aircraft seat, by more effective restraining mechanisms, by additional use of helmets, by the wearing of sufficient protective equipment and by providing foolproof and easily accessible escape facilities. It is realized that considerable work is currently being done along these lines. Such endeavor will undoubtedly contribute significantly to human safety in flight.

Concerning the care of survivors of aircraft accidents, this study indicates that the predominant medical requirement is for the care of fractures, cerebral injury, and burns. The number of vertebral fractures is so high that in all cases of doubt it might be well to consider this injury present until proven

otherwise. On the other hand, internal injury is so infrequent that emergency abdominal or thoracic surgery need seldom be anticipated.

As a matter of closing perspective, it is pertinent to point out that during the period covered 18,294 individuals were involved, as passengers or crew, in major USAF aircraft accidents. Three thousand nine hundred and fifty-seven of these received fatal or major injury. Fourteen thousand three hundred and thirty-seven, or 78%, walked away with little or no injury. This definitely indicates that survival is the rule.

SUMMARY

Injuries incurred in USAF aircraft accidents during the three-year period 1 January 1951 through 31 December 1953 have been analyzed.

The majority of fatal injuries were the result of accidents wherein there was disintegration of the aircraft and little could have been done to enhance survival. However, a significant number of fatal injuries occurred as a result of failure to use protective equipment or because of inadequate protective equipment.

The most frequent major non-fatal injuries were fractures. Surface wounds and burns were often encountered. There were very few internal injuries, and cases of hemorrhage and shock were seldom reported.

It is concluded that in the care of aircraft accident casualties the medical profession is primarily confronted with treatment of fractures, cerebral injuries, and burns. The development of more adequate protective equipment and the wider use of available equipment will reduce the number of injuries.



Effectiveness of Six Intra-Oral Radiographic Exposures as a Case-Finding Procedure*

By

WESLEY O. YOUNG, D.M.D., M.P.H.†

WALTER J. PELTON, D.D.S., M.S.P.H.‡

(With one illustration)

THE treatment and control of chronic diseases have been facilitated by the development of simple tests which serve as preliminary screening procedures in case-finding surveys. The serological tests for syphilis, and the small film chest radiograph for the detection of chest abnormalities, for example, have proved adaptable for mass screening purposes. Large-scale population testing with these devices has proved valuable, both for the collection of morbidity data and for the detection of individuals needing further diagnostic services.

The development of multiphasic screening programs has shown that important advantages accrue where it is possible to perform a series of screening procedures at the time an individual reports to a testing center. The cost of organizing a community and educating the public to the point where individuals will report for screening is not greatly altered whether a single test or a battery of tests is used. In fact, the drawing power of a battery of tests may so enhance the impact of the appeal that the same community effort may bring in greater numbers than would be the case if the appeal were directed to only a single test. The consolidation of testing procedures also results in savings in terms of administrative expense and personnel.

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† Senior Assistant Dental Surgeon (R), Division of Dental Resources, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D.C.

‡ Dental Director, Chief, Division of Dental Resources, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D.C.

The concept of multiphasic screening has been well expressed by Chapman.¹ "Multiphasic screening examinations are not intended to screen out of the population every case of diabetes, syphilis, tuberculosis, and the other diseases for which tests are made. It is intended, rather, to screen out in the most economical fashion many thousands of cases that would not otherwise be found. Although for practical purposes a screening test may be a diagnostic test, the whole screening procedure is not intended to result in the actual and immediate diagnosis of disease. It is intended to raise the index of suspicion for a disease so that additional tests will be done."

The development of methods for the inclusion of dentistry in mass surveys has lagged. Effective and practical examination methods for the detection of dental caries are available and are widely used. Various methods of oral examination, ranging from a rapid screening with a tongue blade, to a detailed clinical examination supplemented by bite-wing radiographs, have facilitated the study of dental caries in large population groups. These techniques are relatively simple and inexpensive, yet are sufficiently accurate to gather the type of data that is needed to establish prevalence rates.

Dental caries, however, affects almost everyone and the use of mass screening methods in order to raise the "index of suspicion" for this disease appears to be of doubtful value. Nevertheless, the detection of other types of oral pathology would appear to be a logical function of population screening. Unfortunately, the development of practical methods for the detection of these pathologies in public health surveys has been delayed. Conditions such as periodonto-

clasia, cysts, abscesses, impacted teeth, and the existence of retained roots and foreign bodies may be detected by full-mouth radiographic examination, by pulp testing, and by a clinical examination and history. These methods, while satisfactory in clinical dentistry, do not lend themselves to public health surveys because they are cumbersome, time-consuming and expensive.

It would appear that if dentistry is to participate effectively in multiphasic screening programs or chronic disease surveys, it will be necessary to develop screening methods which are less expensive and more rapid than the methods now in use. While clinical examinations are satisfactory for the detection of dental caries, it would seem that some type of radiographic examination would be necessary for the detection of most other oral pathology. The conventional radiographic survey of the mouth utilizing 14 or 16 films, does not seem practical as a case-finding procedure for mass screening of an adult population. This study is an attempt to explore the value of using an abbreviated radiographic examination for this purpose.

METHOD

Two sets of radiographs were taken on 50 patients—a conventional 14-film radiographic examination, and a special set of six radiographs. The six-film set of radiographs included a No. 2 periapical film of the upper and lower incisor areas, and four No. 3 bite-wing films used to obtain periapical views of the bicuspid and molar areas (Figure 1).

The two sets of radiographs were read and recorded independently. An attempt was made to measure the area covered by the two types of examination. A record was made of: (1) the number of teeth observed (in which at least three-fourths of the tooth was shown without distortion); (2) the number of teeth in which the lamina dura could be traced over the apical area; and (3) the number of alveolar crests that could be seen.

The radiographic findings were recorded so that the results could be analyzed in two

ways—the total number of conditions found, and the number of individuals exhibiting the specified condition. In the analysis of the findings on a case-finding basis, a patient was considered to have a mild periodontal disturbance if three or more teeth showed loss of the lamina dura over the alveolar crest. Severe periodontal lesions, apical bone changes, impacted or unerupted teeth, retained roots or foreign bodies, or other conditions were considered to have been detected if the set of radiographs showed one or more of the pathological conditions. A pathological condition was recorded if any evidence could be seen of its presence, even if further radiographic examination would have been necessary for complete diagnosis.

Significant pathological conditions found by radiographic examination were classified as: (1) mild periodontal lesions (disturbance of the alveolar crest); (2) severe periodontal lesions (alveolar resorption including half the length of the root); (3) apical bone changes; (4) impacted or unerupted teeth; (5) retained roots or foreign bodies and; (6) other conditions.

FINDINGS

Probably the most accurate indication of the usefulness of the six-film radiographic examination can be determined by an analysis of the number of specified areas of the mouth that could be observed (Table I). There were 1,366 teeth present in the 50 mouths examined. It was possible to observe 1,358 (99.4%) of these teeth in the 14-film radiographs. (A tooth was considered to be observable if three-quarters of the tooth could be seen without distortion). In the six-film series, 1,119 (81.9%) of the teeth could be seen.

An equal number (1,366) of apical areas were present in the 50 mouths. The 14-film radiographs showed the lamina dura over the apex of 1,271 (98.0%) teeth, while in the six-film series it was observable in 974 (71.3%) teeth. Ninety-seven percent of the 2,732 alveolar crests present could be seen in the 14-film series. The six-film radiographs showed 2,135 (78.1%) of the alveolar crests.

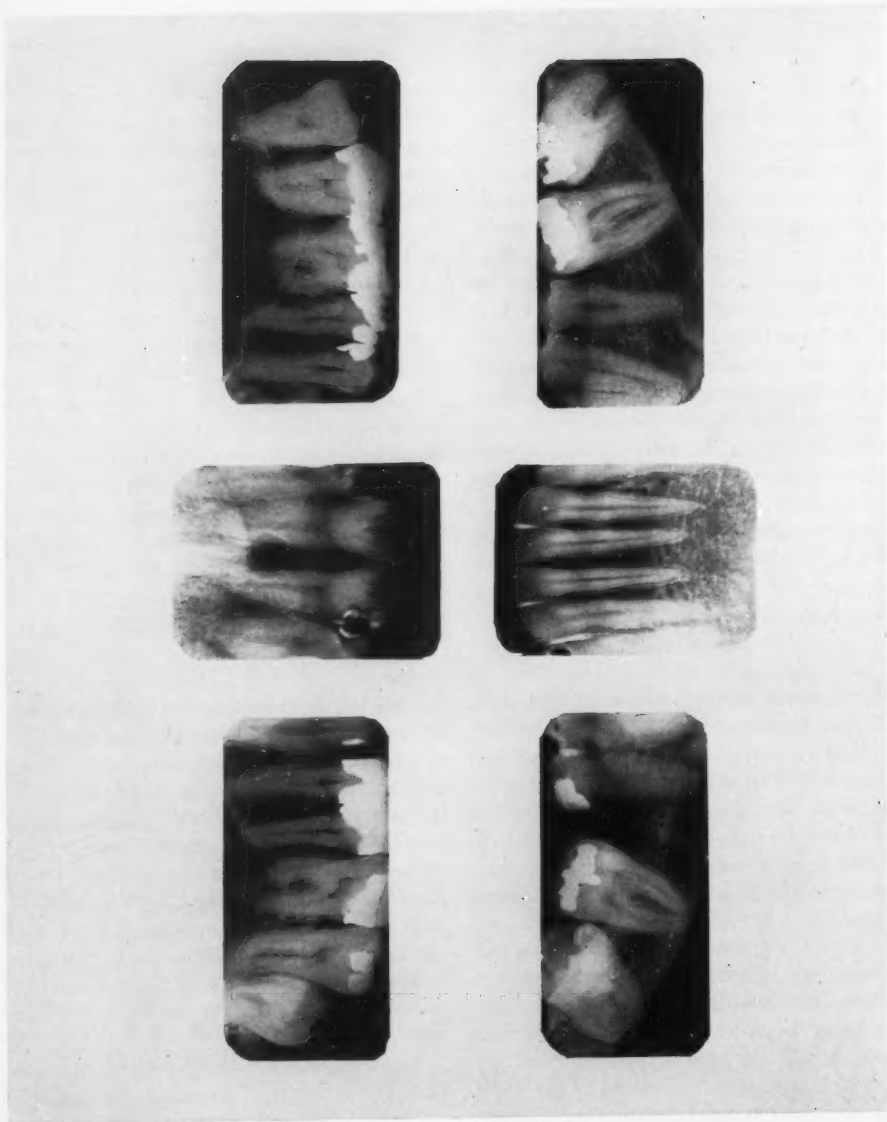


FIG. 1. Six-film series of intra-oral radiographs utilizing No. 3 bite-wing films to obtain periapical views of the posterior teeth.

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TABLE I

NUMBER OF SPECIFIED AREAS PRESENT IN THE CASES EXAMINED, AND NUMBER AND PERCENT OF THESE AREAS OBSERVED IN THE 14-FILM AND 6-FILM RADIOGRAPHS

Areas	Total Present		Observed in 14-film series		Observed in 6-film series	
	No.	%	No.	%	No.	%
Teeth	1366	100.0	1358	99.4	1119	81.9
Apical areas	1366	100.0	1271	93.0	974	71.3
Alveolar crest	2732	100.0	2660	97.4	2135	78.1
Total	5464	100.0	5289	96.8	4228	77.4

In the 50 sets of radiographs examined, 358 pathological areas were found in the 14-film radiographs (Table II). The majority (331) of the areas of pathology noted were radiographic indications of periodontal disturbances—295 of which were seen in the six-film series. Three areas showed apical bone change. Nineteen impacted or unerupted teeth, and five retained roots or foreign bodies were also found. The six-film series detected all of these conditions.

Similar results were found when the films were analyzed on the basis of the number of cases in which the specified pathological conditions were found (Table III). In the

50 sets of 14 films examined, 31 showed three or more areas of mild periodontal involvement. The six-film radiographs found 27 (87.1%) of the cases showing at least three areas of involvement. The six-film series detected all of the cases showing evidence of the other five types of pathological conditions.

DISCUSSION

The six-film radiographic examination gives a limited view of the mouth because of the number of films used. Generally a good view was given of all of the posterior teeth, the lower incisors, and the upper central

TABLE II

NUMBER AND PERCENT OF SPECIFIED DENTAL CONDITIONS FOUND BY 14-FILM AND 6-FILM RADIOGRAPHIC EXAMINATION

Condition	Areas found			
	Observed in 14-film series		Observed in 6-film series	
	No.	%	No.	%
Mild periodontal disturbances	288	100.0	256	88.9
Severe periodontal disturbances	43	100.0	39	90.7
Total periodontal disturbances	331	100.0	295	89.1
Apical bone change	3	100.0	3	100.0
Impacted or unerupted teeth	19	100.0	19	100.0
Retained root or foreign bodies	5	100.0	5	100.0
Other	—	—	—	—
Total	358	100.0	322	89.9

TABLE III
NUMBER AND PERCENT OF INDIVIDUALS IN WHICH SPECIFIED DENTAL CONDITIONS
WERE FOUND BY 14-FILM AND 6-FILM RADIOGRAPHIC EXAMINATION

Pathological condition	Cases found in 14-film series		Cases found in 6-film series	
	No.	%	No.	%
Moderate periodontal disturbance	31	100.0	27	87.1
Severe periodontal disturbance	6	100.0	6	100.0
Apical bone change	2	100.0	2	100.0
Impacted or unerupted teeth	12	100.0	12	100.0
Retained root or foreign bodies	5	100.0	5	100.0
Other	—	—	—	—
Total	56	100.0	52	92.9

incisors. The cuspid teeth were not visible, and frequently one or both of the upper lateral incisors were distorted so they could not be read. In some cases the lower first bicuspid and third molar apices were not recorded.

Despite these limitations, the special six-film series of radiographs used in this study permitted the observation of about 80 percent of the areas where oral pathology (not observable in a clinical examination) might be expected to occur. This type of examination detected approximately 90 percent of the oral pathologies found in the 14-film examinations of the 50 patients studied.

Although the six-film series does not provide sufficient coverage to be useful in clinical practice, it appears that the method might be adaptable to mass screening programs. For this purpose it probably provides adequate coverage, and it is reasonably economical of time and material. Even if this radiographic examination were supplemented by a visual examination of the oral cavity (to detect oral cancer, leukoplakia, etc.) it would appear possible to fit it into the framework of a multiphasic screening program.

SUMMARY AND CONCLUSION

The results of a study of two sets of radiographs taken on 50 patients has been presented. For purposes of comparison, a conventional 14-film set of radiographs and a special six-film series were taken on each patient. The six-film series utilized No. 2 periapical films in the upper and lower incisor region, and No. 3 bite-wing films to obtain periapical views of the posterior areas of the mouth.

The two sets of radiographs were read separately and the results recorded. The six-film radiographic series permitted the study of a large portion of the mouth and detected about 90 percent of the pathologies seen in the 14-film full-mouth radiographic examination. It is suggested that this type of radiographic examination may be a practical case-finding procedure for examining adult population groups as part of a multiphasic screening program.

REFERENCE

- ¹ Chapman, A.L. The concept of multiphasic screening. Public Health Reports 64:1311, Oct. 21, 1949.



The Navajo Health Problem, Its Genesis, Proportions and a Plan for Its Solution*

By

FRANK S. FRENCH, M.D.,† JAMES R. SHAW, M.D., AND JOSEPH O. DEAN, M.D.†

EXTENDING into New Mexico on the east and into Utah on the north, the Navajo Reservation lies principally in the state of Arizona. It constitutes one of the more arid and barren regions of the Great American Desert—a vast expanse of shifting sand, rock outcrop, jutting tablelands, dry arroyos, and, in the far mysterious distance, the soaring majestic mountain tops, revered and worshiped by the Indian.

On the lower levels are found sagebrush, yucca, cactus and a few wild flowers. Rare are the trees—a few cottonwoods which grow along the arroyos and on the banks of the few running streams of an arid region. Higher up, on the mesas and in the mountains are piñon, cedar, scrub oak, juniper, white pine, and spruce. Great washes created by the runoff of sudden heavy rains, fan across the desert as long, tortuous and treacherous valleys of sand and rock.

It is difficult to conceive how a population of nearly 80,000 people can eke out an existence on this barren waste that extends 270 miles from east to west, and 170 miles from north to south. Because of the scarcity of vegetation, the land holds little water. Spring and autumn storms turn the arroyos and dry washes into raging torrents that destroy what little planting lies within the flood. Little water remains to support the rebirth of plant life. Between storms the country bakes.

In winter, the land is swept by cruel winds; snowdrifts block what few roads cross the Reservation.

Yet here lives the Navajo, a people who

have survived and increased, despite intense heat and cold, poverty, hunger, and sickness; despite the wide gulf that separates their culture from ours.

It is not known with any certainty when the present Navajo culture began. The earliest known hogan site indicates that the Navajos were living in New Mexico at least as early as the year 1540.¹ Kluckhohn and Leighton state that the first known reference to the Navajos in a European document is contained in the report of a Franciscan missionary in 1626.¹

During the era of Spanish and Mexican control, the Indians were constantly at war with the White Man. The Navajos and Apaches, in particular, made life uneasy and hazardous for settlers in the southwest. From time to time, military expeditions were sent against them. In one, the Spanish drove a large number of Navajos into the Canyon del Muerto and massacred them all, men, women, and children. In 1846, General Kearny took over the responsibility of protecting the southwestern territories acquired from Mexico; and during the next fifteen years the Government tried in vain to stabilize the Navajos. Military posts were set up in Navajo-land, and Indian agents brought in to supervise them. Many treaties were negotiated and broken by both sides. The so-called "bad faith" on the part of the Indians resulted from the fact that the military negotiated treaties with Navajo clan heads, or "headmen," believing them to be tribal chiefs and responsible for the acts of the entire tribe. When clans which had entered into no agreements were found guilty of violating treaties other clans had made with the white man, they were punished severely and branded "dishonest and incorrigible."

In 1862, when the Army was preoccupied

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† Bureau of Indian Affairs, Department of the Interior, Washington 25, D.C.

with a Confederate invasion from Texas, the Navajo and Apache took advantage of this distraction and stepped up their raids upon the encroaching Rio Grande settlements.¹ By the fall of 1862, the remnants of a proud but defeated Confederate army had withdrawn before the advance of General Carleton and his troops brought on from California, leaving New Mexico and Arizona free from the threat of the invader.²

With no Confederates with which to do battle, General Carleton's soldiers became restive and threatened to resign and return home unless they saw some action. The General needed an objective and the Indians provided it for him. At a conference with Governor Connelly in Santa Fe it was decided to give Colonel Kit Carson, of Taos, command in the field with orders to subdue the Indian.

Carson, at first, was not receptive, for he believed the Indians could be brought to terms without a war.² But finally he was prevailed upon, and headed the expedition which brought the Navajos to their knees. He did not conquer them in battle. He bottled them up in the Canyon del Muerto, burned their crops, killed their sheep, and starved them into submission.

Group by group they straggled into Fort Defiance hungry, sick, defeated. After enough had gathered, Carson sent them by foot on the "Long Walk."

General Carleton had not, however, provided well or planned with sufficient understanding of the Navajo to make his camp a success. The Bosque Redondo did not witness the people turning immediately to dry farming and becoming the docile, industrious, productive raisers of farm crops that he had envisioned. Instead, yearning for their homeland and sacred mountains, spiritually deprived, emotionally frustrated and bewildered, half-starved on short rations, physically ill and depleted, the people went into such a decline that General Carleton became alarmed and began an about-face. To return the Navajo to their homeland became his new objective.

Early in 1868, Congress passed an Act authorizing treaty-making with Indian tribes. And by June 1, 1868, a treaty had been drafted and accepted by both the Government and the Indians, which provided for the return of the Navajo to their homeland.

Manuelito, the last Navajo Chief to surrender to Carleton's soldiers, later was to say, "The days and nights were long before it came time for us to go to our homes. The day before we were to start we went a little way toward home, because we were anxious to start. We told the drivers to whip up the mules, we were in such a hurry. When we saw the top of the mountain from Albuquerque, we wondered if it was our mountain and we felt like talking to the ground, we loved it so, and some of the old men and women cried with joy when they reached their homes."²

More than 86 years have passed since the United States and the Navajo shook hands and pledged mutual aid, friendship and loyalty. The Navajo have kept their pledge.

Somewhere between 70,000 and 80,000 people live on the Reservation today. They are still poor and, for the most part, hungry. Children sent to boarding schools put on weight almost at once, and lose it when they return to their homes. The people raise what sheep they are allowed, for wool and for food. The women shear the sheep, card the wool, spin the yarn without the aid of a spinning wheel, color it, and weave the rugs for which they are famous. Their average wage for this labor is said to be under ten cents an hour. A few of the men are skilled at silver-smithing.

Because of the scarcity of grass for their sheep, the people must wander from place to place. In the summer they follow their flocks and live in camps. In the winter they retreat to the security of their hogans.

The necessity of learning to compete with white man's civilization drives them into town once a week. On Saturday nights the streets of Gallup and other peripheral towns overflow with Navajos, the women in satin blouses and velvet skirts of brilliant hues,

adorned with silver and turquoise; the young men in cowboy jeans and ten-gallon hats. They parade the streets in their best finery, shy, apprehensive, and ill-at-ease. Some of the young men drink wine. Some drink too much. Saturday night is Navajo night in town.

Another far brighter picture may be seen in a trading post on the desert, or on the grounds of a Bureau, or a mission school. Here uninhibited by the overwhelming weight of white man's civilization, yet schooled in it as their forebears were not, are a new race—teen-agers in a state of emergence, bridging the gap between cultures. They carry themselves with assurance and poise. They laugh and play with the same delightful zest and impudence that characterize teen-agers anywhere. There is hope for the young people who are in school.

But what of the others? What of the great numbers of young isolated with their elders on remote regions of the Reservation, growing up in ignorance, poverty and disease?

It has been said throughout history that poverty and disease have walked hand in hand. Because of the Navajo Emergency Education Program, now in its first year of operation, 8,200 more children are in school this year than were a year ago. But so long as the Navajos remain on the barren wasteland on which they live, without communities, roads, water, sanitation, or the opportunity to earn a living wage, they must continue to live in squalor and disease. Public health measures and health education must be initiated on a large scale.

Too much reliance, however, should not be placed on public health measures alone, for all such measures must be cut to fit the pattern of the existing economy, culture, and the comprehension of a still primitive and benighted people.

The center of health machinery on the Reservation today is the 115-bed general hospital and the 100-bed tuberculosis sanatorium of Fort Defiance. Around this is a ring of four 35-bed hospitals, located at Tuba City, Shiprock, Crown Point, and

Winslow. A similar hospital at Keams Canyon serves the Hopi. Two public health stations, one at Tohatchi and one at Chinle, and thirteen public health nursing stations located in whatever rooms can be found for them, complete the Bureau-operated health machinery. The outpatient clinic in the Navajo Community Center at Gallup is served two hours a day by a panel of Gallup physicians paid by Government contract. Four hundred sixty-five contract beds in private sanatoria located in several states are filled with Navajo tuberculous patients.

The out-post at which the health effort first meets the sick Navajo is a one-room hogan, the laundry of a school, a room in a mission church, or a corner of a trading post. The nurse must beg accommodations wherever cover can be obtained. Here she attends as many as she can. The nursing conference is used as a means of getting the people to a central point where services can be offered to as many as possible.

These are the facilities. What of the morbidity load? Actual statistics are unavailable. The following facts, however, are known. Only emergency and the most urgently acute cases are being accepted in the hospitals. The rest, including pneumonias, are being turned away for lack of beds, nurses, doctors, and operating funds.

The 465 off-reservation beds for tuberculous Navajos have been filled essentially without the aid of a case-finding program. How many more cases and potential cases are at liberty seeding the disease is not known. It is ironical that this cesspool of contagion is still unplumbed while tuberculosis sanatoria throughout the country are closing for lack of patients.

If the incidence of tuberculous meningitis in young children can be accepted as criterion, the tuberculous morbidity load on the Navajo Reservation is large. Although only a rough approximation of the non-tuberculous load has been made, it is apparent that the need far exceeds the provisions of the present medical care program.

The field nurses were asked, "How large

is the morbidity load?" The doctors and nurses in the hospitals were asked, "How well prepared are you to meet the pressure of this morbidity load?" The answers produced this information:

For every sick Indian seen at the Nurses' Health Conferences and at hogan visits, it was estimated there were at least five who should have been seen but were not; beyond that was the inability of the field hospital and of the Fort Defiance hospitals to accept more than a fraction of those who came to the hospital doors, seeking and needing hospital care.

Public health measures, aimed at the elimination of the sources of disease are urgently needed on the Navajo Reservation. Such measures will be expanded in future programming. The number of beds for general medicine and surgery will be increased. Tuberculosis off-reservation beds will be contracted for in number sufficient to meet the demand which results from a thorough and vigorous case-finding program.

Concurrently programs aimed at the elimination of poverty, ignorance, superstition, and distrust must be relentlessly pursued.

The future of Navajo health is filled with

promise: it will find the Public Health Service, with its assortment of technical competencies working side by side with the Bureau of Indian Affairs in a collaborative effort toward a common objective—the health and well-being of 80,000 American citizens—the Navajo.

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COMMISSION ON NURSING SERVICES

Mrs. Frances P. Bolton, Congressman, 22nd District of Ohio, has introduced House Joint Resolution 171 (also introduced in the Senate as Joint Resolution 56, by Senator H. Alexander Smith) to establish a National Commission on Nursing Services, composed of twelve members.

A shortage of graduate nurses has occurred. This situation has been brought about by such factors as growth in population, increasing longevity, new scientific and technical advances, but probably as much so by other factors such as increase of hospital beds, shorter working hours, and a tendency on the part of the patient and family to want more nursing attention.

To analyze and study the many problems confronting the nursing profession, and to stimulate interest in the nursing field, the above mentioned bills have been introduced.

Until such a commission is established by the government we learn that there is a National Committee for Commission on Nursing Services with the address: 3088 Mayfield Road, Cleveland 18, Ohio. Persons interested in the many problems in increasing the numbers of graduate nurses should contact that committee.

The Nurse in Aeromedical Evacuation*

By

LT. COL. FRANCES LAY, USAF (AFNC)**

I AM proud to discuss "The Nurse in Aeromedical Evacuation." I have had the opportunity of doing this type of work myself and of observing the results in hospitals during time of war and peace. I believe it is something of which the entire nursing profession can be proud.

In early 1942, due to the extreme shortage of Flight Surgeons, nurses who volunteered and were physically qualified went to overseas theaters as "Flight Nurses"—that was a strange title in those days. These nurses had received no special training and upon arrival overseas were assigned to troop carrier squadrons. Under the direction of a flight surgeon, they put a few emergency supplies in a musette bag and "hitch-hiked" to designated front line holding stations, collected their patients and hitch-hiked a ride back for themselves and their patients. Any type of aircraft sufficed—some had stretcher racks, in many instances the litters were secured to the floor with rope. Thousands of patients were transported under these conditions. Aircraft which had carried troops or cargo up front brought the patients back. Combat efficiency was increased and *lives were saved*.

From the beginning this method of patient transportation and this new field of nursing were successful. How to make it more successful was the next step.

The fundamental thinking was changed very little—our flight surgeons were convinced in the beginning. The problems in Air Evacuation were: (1) Studying the effects of flying on various patients, (2)

developing techniques and equipment, (3) overcoming resistant attitudes and (4) training personnel. These I would like to discuss.

Flight surgeons and flight nurses have done a great deal of research in regard to the effects of flying on various types of patients. Specifically, I will mention some examples:

A study was made of 1,777 patients with cardiac and pulmonary disorders who were evacuated by air. No contra-indications were found to the air transportation of these patients at altitudes below 10,000 feet. In only 3% of patient flights has it been necessary to fly above 10,000 feet, and then only briefly.

Studies have also been made in regard to the air transportation of psychiatric patients. When the patient is properly prepared and the medical crew well-trained we have found no disadvantages.

We have found that it is preferable to transport special equipment to the acutely ill poliomyelitis patient instead of moving him by any means.

Research shows us that with thorough diagnostic study, proper screening, and careful preparation practically all patients can be safely and advantageously transported by air. In pressurized aircraft, problems due to pressure changes are reduced to a minimum.

Techniques and equipment have changed remarkably since 1942. Traditional nursing techniques have been modified so that they can be efficiently performed in flight. The care of patients goes on as if they were still in a hospital.

Examples of our new equipment are respirators, the Stryker frame, loading devices and probably most important, modifications of aircraft.

A portable full-body type respirator, created especially for use in aircraft, was first

* Presented at Nurses' Section at the 61st Annual Convention of the Association of Military Surgeons of the U.S., Hotel Statler, Washington, D.C., Nov. 29-Dec. 1, 1954.

** Head, Department of Nursing, Gunter Branch—USAF School of Aviation Medicine, Gunter Air Force Base, Alabama.

put into use in January 1952. This unit weighs only 200 pounds, compared with the 2000 pound Emerson or Drinker type. It will operate on the electrical system of an aircraft, on regular current found in hospitals or on a storage battery. It can be transferred in standard military ambulances and is easily loaded into an aircraft. This piece of equipment was greatly needed because of the difficulty sometimes encountered in transferring patients from the full-body type respirator to the existing portable types. As you know, patients become very attached to the full-body respirators and do not trust the portable ones.

Not new to the hospital care of patients who require frequent turning, the Stryker frame and Foster bed were found to be ideal for use in flight. Largely due to the use of this equipment, bedsores were almost nonexistent in patients returning from Korea. All spinal injuries and many burned patients were flown back home on Stryker frames.

In contrast to the strict cargo aircraft used during World War II present aircraft provide comfort approaching that of a hospital ward. Modifications include insulation to reduce noise and vibration, better heating and ventilation systems, better oxygen equipment, more space between litters, and pullman type curtains which insure privacy for patients.

Better means of loading and unloading patients have been devised. They are a necessity when a high-door aircraft is being used. We have developed ramps and mechanical lifts which are sturdy in function and appearance—our patients now feel secure while being moved from ambulance to aircraft.

Many of our aircraft are now pressurized. This year has brought the C-131A,* a Convair aircraft especially modified for the air transportation of patients. It is air conditioned and pressurized. It is truly a modern "flying hospital ward," and is the result of much experience and research.

Attitudes of patients toward flying have not been a problem. Practically all of them are grateful for rapid and comfortable transportation. Every possible measure has been taken for the physical and mental security of the patients. They enjoy their flights. There has been resistance from some of our leaders who believed that the traditional methods of moving patients were good enough. As Air Evacuation has developed this resistance has become less.

Our Medical Crews are now fully trained. Flight Nurses are well qualified, especially selected volunteers who have completed the six-week flight nurse course and have received on-the-job training. Their training, in general, includes instruction and practice in special equipment and techniques, rescue and survival, aviation physiology, and a review in the care of various types of patients with emphasis on inflight care and emergency procedures.

The technicians complete an eleven-week course; their instruction is similar to that given to the flight nurses.

Compared to what it was 10 years ago, air transportation leaves little to be desired. Certainly much has been accomplished, however, we have not solved all of our problems yet. At present work is being done to develop a life vest which can be worn comfortably by patients flying over water and which would still provide adequate in-water support for heavy casts or unconscious patients if necessary. The feeding of patients on long flights requires further research. At present most of our patients receive the traditional box lunch, supplemented by soups, ice cream, and various beverages. This is adequate but not ideal. Another device we are working on is a litter lift which will be an actual part of the aircraft. This is greatly needed when picking up patients at civilian airports or isolated landing strips where no loading devices are available.

I believe that this new field of nursing is a definite advantage for the patient. Even though a very small percentage of the Air

* See *Military Surgeon*, Vol. 114:396, May, 1954.

Force Nurses are doing this work at a given time, it has been a challenge to us all. In case of a national emergency we would undoubtedly again transport patients in the strict cargo type aircraft. However, this time we will have enough trained medical personnel, and we will have a great deal more information about how to care for our patients. Experience and research, primarily by our Air Evacuation crews, have taught us much.

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INTERNATIONAL GROUP OF FLIGHT SURGEONS AERO MEDICAL ASSOCIATION

WASHINGTON, D.C., MARCH 21, 1955



U. S. Air Force Photo

1st Row (L to R): Col. T. Y. Roschier, Surg. Gen., Finland; Capt. J. Adi, Surg. Gen., Syria; Maj. A. Kaplan, Turkey; Brig. A. M. Geissa, AF Surg. Gen., Egypt; Brig. Gen. J. E. Brouwer, AF Surg. Gen., Netherlands; Col. G. B. Green, USAF (MC); Maj. Gen. Dan C. Ogle, Surg. Gen. USAF; Col. M. Baeza M., Chile; Maj. R. V. P. Soetens, Belgium.

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EDITORIALS

Misguided Missiles

MISGUIDED MISSILES is the title of a small booklet recently published by the Travelers Insurance Companies of Hartford, Connecticut. As you might suspect the misguided missile is the automobile.

A benefactor of mankind, this vehicle is also a malefactor. Standing harmlessly at the curb or in the garage the automobile is usually a beautiful thing to behold. Made by man who puts it in motion it can bring pleasure, be of service to him, or be an instrument which inflicts suffering and even death.

As we look through this booklet, *Misguided Missiles*, we learn that deaths due to the automobile in 1954 totaled 35,500 and injuries of all types 1,960,000. Excessive speed accounted for the killing of 12,380 persons and the injuring of 659,000 more.

We are told that the drivers under 25 years of age, although accounting for only 14 percent of the total number, were involved in 24 percent of the fatal accidents for 1954. Saturdays and Sundays are the worst days of the week for accidents, 39 percent of the deaths and 35 percent of the injuries occurring on those days. The pedestrian is not without blame as 7,700 deaths were due to "jay walking."

The question naturally comes to our minds, "What can be done about all this?" There is no one answer. Reasonable speed, mechanically perfect cars, alert drivers, and alert pedestrians will lessen this toll of human life and suffering. One other question we ask, "Is the race of the automobile manufacturer to produce machines with more and more horsepower justified?" We feel that there is no need for this race nor for such high powered vehicles.

Since we seem to be unable to control the speed by the willingness of the drivers would it not be logical to control this phase of competition by legislation? Would not the manufacturers welcome this control so they could devote their energies to safety, comfort, and economy in the automobile of the future?

There is some ray of hope in the booklet. A slightly better accident record was attained in 1954 than in 1953. Let us hope that 1955 will still be better. Only by constantly keeping the matter before the public will better traffic records be obtained.

The Term—"Medicine"

IN ITS pursuit of health and human welfare, modern medicine has long ago left its centuries-old boundaries. Just when in the 20th century this exuberance actually started would be hard to say. But the expansion of medicine and its overflow into many other fields of science is now an established fact. The old fences of medicine were washed away, and there is nary a field of science without having some contact with and usefulness for medical research.

The more surprising it will look that the British still have a restriction on their current usage and meaning of the term "medicine." They are puzzled by American publications of such titles as "Medical Progress, 1954," or "Annual Review of Medicine," since these publications include such fields of science which according to them have nothing to do with medicine. In their journals the reviewer of American books may sometimes feel the need for an explanation of the American language, perhaps in the pedantic air and the slightly scolding manner of the schoolmaster who attempts to refrain his pupils from trespassing upon the rules of grammar.

The other day, for instance, a book-reviewer of a British medical journal carefully coached his readers that the word "medicine" was being used by the Americans "in the sense of *great medicine*, including surgery and dentistry." He might have added in fact that, as in the case of the American Review of Medicine, the term might also occasionally include progress in the field of psychology, physiology, biochemistry, and other branches of natural sciences.

Indeed, medicine has become a much wider field than either the narrow sense of our British brothers assumes or the editorial committees of certain American standard dictionaries would allow. According to a currently accepted wider sense, medicine is "science and art dealing with the prevention, cure and alleviation of disease." The British journalistic meaning would still restrict the science to the narrow technical field of therapy by potions and pills, a field more properly called "internal medicine," to distinguish it from the therapeutic field of ointment, salve, forceps and knife, a field which since ancient times belonged to surgeons, dentists, itinerant wound-doctors, lithotomists, herniotomists, emasculators, etc. The British effort in conserving medicine and surgery in their historical, almost diametri-

cally opposite separation does not appear warranted now. It is not only academically unjustified, but it is also a denial of the essential unity of medicine.

In our modern century of universal progress, medicine as the science and art of preventing, curing or alleviating disease has grown out of its historical, Victorian or other, limitations. It also appears to some of us that in its miraculous expansion medicine had also lost its limited character as a definite field of science.

Medicine became a part of almost everything, as if it were a special consideration of the universe, a humanistic aspect of things and individuals and institutions, the medical look of the eyes of life-savers upon the world as the biological environment of Man. It is this encyclopedic *medical aspect of the Universe* which—as never before—offers a panoramic view of man's environment to the medical scholar and artful healer, and a feeling of unity with other sciences. Only because of its greater universal expansion and penetration into life's environment, because of its change into *a greater aspect of all things* could modern medicine subjugate the kingdoms of Nature and forge new weapons of them for the protection and restoration of healthy human life.



"By the neglect of the study of the humanities, which has been far too general, the profession of medicine loses a very precious quality."—WILLIAM OSLER

Around the World

By

CLAUDIUS F. MAYER, M.D.

LIBYA and the other African countries which make the southern brim of the Mediterranean Basin north of Lat. 30°N are strategically very important today. The health status and the medical peculiarities of this area are therefore of great interest to us. Most of the *North African countries* are still being treated as European colonies, which makes them hotbeds of political discontent since *colonialism* is now despised by the natives. Moreover, a psychological warfare and Communist-inspired political propaganda is going on against the Europeans everywhere in Africa, and the native folks are very easily taken in by it.

Physicians and health workers know that such propaganda interferes with medical treatment. A British practitioner in *Nairobi* wrote that he found the Kikuyu tribe very *averse to injection therapy* because it had been told that with the injections the Europeans were trying to exterminate them and their livestock. The natives are convinced that the foreign doctors give them poison or plain water, according to the instructions they receive from their governments. Under such conditions it is hard to work for the welfare of these people.

All North-African countries are undeveloped, very much in need of modern sanitation, public health measures, etc., but *without adequate funds and personnel*. Libya, for instance is a terribly poor country; the average Libyan's annual income is but \$35, or 28 cents a day for a family with three earning members. Fortunately, as a dry country, it is relatively free of diseases. Bilharziasis (the scourge of Egypt) and hookworm are no problem. Neither have malaria mosquitoes much chance to survive in Libya except in the coastal region. The main troubles come from diarrhea among infants, trachoma, and tuberculosis.

Libya has about 20 hospitals and 150 dis-

pensaries, but there are hardly a hundred doctors, a little more than 100 trained female nurses, and about 400 medical orderlies with some elementary training in nursing. How can the hygienic conditions of such poor people be advanced or improved? How can such people who often have but a single shirt of their own be trained in the ritual of personal cleanliness?

The conditions are not much better in the desert area that forms the larger part of Algeria. *The Algerian Sahara* is about 4½ times larger than France, of which it forms an integral part. More than a million people are living there under the most primitive conditions, except the few thousand Europeans, civilian and military employees of the French government. Owing to the economic poverty of the land, the folks of the Sahara are condemned to permanent social stagnation. The lack of water and the irregularity of rains depress the standard of life to an unimaginably low level.

The health and welfare of the area is now the task of a Departmental Council of the Sahara, a special section of the *Algerian Red Cross*. The Red Cross work, originally limited to the Highland and the Saharan Atlas Mountains, has been expanding since 1951 into the Sahara proper. The *medical service of the Saharans* is based upon the excellent facilities of governmental doctors. Wherever they are posted there is sure to be a modern dispensary with adequately equipped laboratory, radiological installations, etc. The doctors are assisted by Catholic nuns devoted to nursing. Several central villages of the administrative network own so-called eye houses ("*beth-alaïnin*") where a nurse attends to the trachoma patients of whom there are so many in this area. An ophthalmological automobile ward also pays periodical visits to the oases of the desert. The Red Cross also

helps the Saharans in child care, supply of bottled milk and milk powder, establishment of school canteens, etc.

At the site of the American air- and naval bases in Africa, the U. S. government also takes its share in the welfare of North-Africans, as for instance in *French Morocco*. The station at Sidi Slimane actively participated in the welfare services of the host country. At a meeting of the French-American Medical Association, held at the French Air Base at Rabat, the Air Rescue Squadron demonstrated its often spectacular operations in rescuing people marooned in the snow of the Atlas mountains, or stranded in vessels aground in Moroccan harbors.

Many diseases of military significance are lurking in *Morocco*. A member of the French Medical Academy revealed that in the forest of Neffik, a 460-hectar wooded area northeast of Casablanca, the reservoir and the arthropod vectors of three important diseases are living in close biological association:—those of Q fever (*Coxiella*), of murine typhus (*Rickettsia*), and of the Hispano-African form of recurrent fever (*Borrelia hispanica*).

For many years Egypt used to be the country where European doctors would send their tuberculous patients for cure and recovery. It was therefore a surprise to hear recently that there are 550,000 tuberculous patients in the land of the Nile, this number growing at an annual rate of 55,000. Only a few of them can be hospitalized since there are few beds for this purpose. Hence, the Egyptian government started to tax admission tickets to amusement places. In this desperate campaign against tuberculosis even the railroad tickets are used as a source of revenue.

Egypt intends to introduce a national medical service by 1960. The plan would require 12,000 physicians, but there are now 7,000 Egyptian doctors only. In the next 5 years Cairo University must train and graduate 5,000 additional native physicians for the service, especially since the native

medical societies do not wish to admit foreign doctors now. In contrast, let us recall that the Arabian American Oil Company opened a new medical center at Dhahran in *Saudi Arabia*. The company also provided a total of \$500,000 to be spent in Arabia on trachoma research during the next five years. A small team of "foreigners" from the Harvard School of Public Health will carry out the investigation for the benefit of the Arab.

The status and progress of medicine in Italy is satisfactory. A change in the Italian law of medical education in 1952 brought the medical curriculum in line with western European pattern. Three minor subjects became integral parts of the Italian education of medical students—biochemistry, microbiology, and radiology. The number of Italian practitioners is probably close to 60,000. They are frequent contributors to the many valuable national medical journals. In recent years the Minerva Publishing Company in Milano enriched the medical world with a long series of specialty journals. The latest in the list is *Minerva Nephrologica*.

Italy maintained 1,327 hospitals in 1950, 712 of these in the North (this figure does not include sanatoria, mental asylums, university hospitals and private clinics). They provided a total of 176,398 hospital beds, which means 3.76 beds per 1,000 inhabitants.

Tuberculosis became a serious problem in the Italian military forces. During the last decade, as a result of modern hygienic measures, primary tuberculosis shifted from the childhood years to adolescent and adult ages. Experience of the *Genova Military Hospital* shows that many young recruits are in a tuberculin-negative status, providing a virgin soil in the Army to tuberculosis infection. Hence, there is an increase among young soldiers in the number of primary clinical forms of tuberculosis.

Italy contributed much to the progress of aviation medicine. The studies of Italian flight surgeons and biologists broadened our knowledge at many points. The general in-

terest in altitude research started with Angelo Mosso's discovery of acapnia. It was Amadeo Herlitzka who suggested $\text{CO}_2\text{--O}_2$ mixture for breathing during high-altitude flights, and this enabled the pilot Donati to reach 14,000 meters in 1933. In the same year several research centers were created for aviation medicine, which further promoted the development of Italian aviation medicine and applied psychology.

To reassemble the scattered parts of victims after an airplane crash must be a very futile task. In 1954, members of the Forensic Medical Institute of Rome succeeded in *recomposing the bodies of 16 crash victims*, passengers and crew, from 62 collected fragments which were individually identified by means of serological study of their group-specific characters.

The Italian Army now owns a *network of blood banks*, with a central bank at the Celio Military Hospital and in charge of the Military Chemico-Pharmaceutical Institute in Rome. During the recent *illness of Pope Pius XII*, which required numerous blood transfusions for treatment, military personnel of all ranks hastened to donate blood for the benefit of His Holiness.

Refugee health workers who recently escaped from *Communist Hungary* stated that the *drug industry* of that country has been completely ruined by the Red regime's emphasis on overproduction. Many newly distributed chemicals and biological products were said to be either poisonous or ineffective. Conscientious doctors of the older generation lost confidence in the present Hungarian drug-supply. A batch of a pituitary extract (:glanduitrin) caused minor disaster by killing several persons after its injection.

Maybe it is their lost confidence in native drugs that made two internists in a *Budapest* hospital try out a new *type of drugless treatment for gastric ulcer*. The treatment was really plain nothing, a simulation of therapeutic action, or a pretense of treat-

ment. By making the patients believe that they were being treated, the doctors were able to promptly reduce gastric pain in 75% of the cases. Hence, the doctors wondered, seeing the miracle, how right Comrade Spersansky in Russia must have been when he wrote that peptic ulcer disease is only a sort of cortico-visceral reflex. Unfortunately, the "reflex" pain soon returned in the majority of the "cured" ulcer patients.

Peptic ulcer has become the *Number One occupational disease* among industrial workers in *Hungary*. It is observed at any age, especially in those engaged in the iron and metal industries. A single plant lost 7 to 13 thousand days in 1952, and all other plants lose many hundred thousand work-days annually on account of *peptic ulcer* complaints. Maybe, the increased morbidity is a result of the political economic shift in the working manners of a formerly overwhelmingly agricultural nation. The customs, the mode of eating, and the rhythm of life are still of agricultural type, while the forced industrialization of the satellite country has displaced many persons from their former field and related farming work into the big industrial environment of factory life. The result is an inevitable conflict since the established mutual relation of body and milieu is unwisely destroyed.

QT BOSTON is a group of lay people who are in need of rehabilitation after *ileostomies*. The club started with five young women. Now, the group has over 100 members. (Q and T were the wards' designations in New York's Mount Sinai Hospital where some of these people were operated on.) They meet each month in Boston. Besides the Mount Sinai organization there is such a club in Bronx Veterans Administration Hospital. Philadelphia also has a colostomy club, and another one started in Los Angeles. The clubs help to work out the technical, emotional, and practical problems of the new "compatients" . . . *Multa paucis!*

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It is a privilege to list the firms who have joined The Association of Military Surgeons as Sustaining Members. We gratefully acknowledge their support.

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62ND ANNUAL CONVENTION

ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES

TO BE HELD

AT

HOTEL STATLER

WASHINGTON, D.C.

NOVEMBER 7, 8 AND 9, 1955

The Association is the only international society devoted to the military aspects of medicine, dentistry, nursing, veterinary medicine, and allied sciences. Noted speakers, appropriate ceremonies and a variety of entertainment will make this year's meeting attractive to attending members and guests alike. There will be an outstanding scientific program devoted to the latest advances and trends in the specialty of military medicine.

For the entertainment of the members and guests, a full schedule of events is being arranged. As in the past, one of the outstanding features is the Honors Night Dinner on November 9 at which the Sir Henry Wellcome Medal and Prize, the Gorgas Medal, the Stitt Award, the McLester Award, the Louis Livingston Seaman Prize, and the Founder's Medal will be presented.

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**Association's Office
Suite 718, New Medical Building
1726 Eye Street, N.W.
Washington 6, D.C.**

ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3d of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.

Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

MEDICAL PLANNING COUNCIL

Under the chairmanship of Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical) a new council was established by the Secretary of Defense to assist in planning and carrying out such plans for the adequate coverage of the health and medical services of the Armed Forces. The new council is called the Health and Medical Planning Council, with its membership composed of the Assistant Secretaries in charge of the manpower and personnel problems of the three services.

Among the tasks for study of the Council there are many recommendations made by the Hoover Commission. The Council's assignments include: (a) establishment of specialty hospitals and their joint staffing, (b) determination of the role of the Department of Defense in emergency medical care, (c) provision of medical care to military dependents, (d) recruiting and training of medical officers, and (e) standardization of medical supply and nomenclature of medical records used in the Departments.

DEPENDENTS OF MILITARY PERSONNEL

A world-wide survey of dependents of military personnel as of December 31, 1954

showed the total to be 2,591,777. On that same date there were 3,180,532 military personnel on active duty.

Army dependents numbered 1,008,564; Navy 632,141; Air Force 812,895; Marine Corps 138,177.

MEDICAL CORPS VACANCIES

The Medical Corps of the three departments, Army, Navy, and Air Force, have a total of 6,377 authorized positions for their regular establishments. Only 51.7 percent of these positions are now filled. The total number of vacancies is 3,080, with 877 in the Army, 1,974 in the Navy and 229 in the Air Force.

Army

Surgeon General—MAJ. GEN. SILAS B. HAYES

Deputy Surg. Gen.—BRIG. GEN. JAMES P. COONEY

DEPUTY SURGEON GENERAL

Brig. General James P. Cooney, MC, who has been Commandant of the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Texas, has been appointed as the new Deputy Surgeon General. He succeeds Major General Silas B. Hays who was appointed Surgeon General and took office on June 1.

General Cooney is a native of Iowa, and after receiving his medical degree from the University of Iowa in 1927 entered the Army Medical Corps Reserve in the grade of lieutenant. He interned at Fitzsimons Army Hospital in Denver and at the end of that internship entered the Regular Army Medical Corps.

At the beginning of World War II he was the chief radiologist at the Gorgas Gen-



Army Photo

BRIG. GEN. JAMES P. COONEY, MC, USA

eral Hospital in the Canal Zone. On his return from Panama in 1943 he served as the executive officer and assistant commanding officer of the England General Hospital in Atlantic City, New Jersey until March 1945 when he was assigned to the European Theater of Operations.

General Cooney has achieved distinction as one of the Army's outstanding authorities on radiology and the medical effects of atomic explosion. He was sent to Japan on a special mission to study the A-bomb survivors at Hiroshima and Nagasaki. He has served as chief of the Radiological Branch of the Division of Military Application, U. S. Atomic Energy Commission. Recently he served as maneuver director for Logex-55 at Fort Lee, Virginia.

General Cooney has been awarded the Legion of Merit with Oak Leaf Cluster, the Bronze Star Medal and the Army Commendation Ribbon. He is a Fellow of the Ameri-

can College of Chest Physicians, Diplomate of the American Board of Radiology, a member of the American College of Radiology, the Radiological Society of North America, the National Tuberculosis Association, and the American Medical Association.

NEW CHIEF—MSC

Colonel Bernard Aabel, MSC, has recently been appointed chief of the Medical Service Corps of the Army, succeeding Colonel Robert L. Black who retired on March 31.

Colonel Aabel was born on March 30, 1907 in Minneapolis, Minnesota. In 1932 he received a Bachelor of Science degree in Pharmacy from the University of Minnesota, and was connected with the pharmaceutical industry in Minneapolis and in La Crosse, Wisconsin until entering the military service in April 1941.

During World War II Colonel Aabel was a participant in the Normandy invasion and continued in the European Theater through Northern France, Central Europe, Rhineland and the Ardennes campaigns. He has served two tours in the Office of the Surgeon General, has been Assistant Military



Army Photo

COL. BERNARD AABEL, MSC, USA

Attaché to Finland, and been Deputy Commander of the Medical Replacement Training Center at Camp Pickett, Virginia.

Colonel Aabel is a graduate of the Medical Field Service School, the Motor Transport School, the Military Censorship School, the Military Strategic Intelligence School and the Army War College. He has been awarded the Purple Heart, Bronze Star, Commendation Ribbon, American Defense Medal, European-African-Mediterranean Theater Ribbon, American Theater Ribbon, Occupation Medal, National Defense Service Medal and the Order of the White Rose (Finland).

He is a member of the American Pharmaceutical Association, the Association of Military Surgeons and the Phi Delta Chi.

Prior to his appointment as Chief of the Medical Service Corps he was chief of Officer and Warrant Officer Procurement Branch in the Surgeon General's Office.

CITES ADVANCES IN ARMY DENTAL CARE

Dental care for the United States Army has made such strides since World War II as to be on a par with the best American dentistry has to offer declared Dr. Miles R. Markley of Denver, Colorado, consultant in operative dentistry to the Surgeon General of the Army.

The effect of this advance on the children of Army personnel, he said, will be a startling improvement in their dental health. As fathers, today's soldiers will understand the importance of proper dental care from their military service days and will assure that their children have adequate dental attention and practice the principles of dental hygiene.

Dr. Markley thus expressed himself on the eve of leaving for Europe with Maj. Gen. Oscar P. Snyder, Chief of the Army Dental Corps and Col. Joseph L. Bernier, Chief, Oral and Dental Pathology, Armed Forces Institute of Pathology for a series of conferences in eight European cities where U. S. Army hospitals and dental clinics are located.

"Our primary mission in going overseas is to impress upon all those who attend our conferences the importance of saving the natural tooth," said Dr. Markley who is known throughout the country for his authoritative studies in the use of amalgam and gold foil.

"With Colonel Bernier to explain the procedures for fighting the enemy bacteria, and myself discussing the methods of prolonging the life of the natural tooth, we hope to leave some pertinent information with our overseas conferees."

Dr. Markley also praised the Army dental intern program which this year had twice as many applicants as the Army could accommodate for the July 1, 1955 internships.

"The caliber of these applicants would delight the heart of the dental service chief at any hospital, civilian or military," commented Dr. Markley when told of the schools represented in the top grade seniors filing applications with the Army Dental Corps.

"Of course, the reason for this is the very splendid internship training offered by the Army Dental Corps," he continued. "Word of these advantages gets around from those who have completed these internships and their subsequent military service and opened up their own offices on Main Street or in a busy urban center."

One of the first dental consultants to be appointed by the Surgeon General of the Army when the dental consultant program was instituted after World War II, Dr. Markley has had a first hand opportunity to observe the development of the present day dental service provided for the troops. He is mainly on consultant status at Fitzsimons Army Hospital, Denver but he also serves in other consultative capacities and is a guest lecturer in advanced dentistry at the Dental Division, Army Medical Service Graduate School, Walter Reed Army Medical Center. Dr. Markley is a member of the American Academy of Restorative Dentistry and consultant to the Council of Dental Research, American Dental Association.

MEMORIAL LECTURE

The first "James Stevens Simmons Memorial Lecture" took place at the Walter Reed Army Medical Center on April 21 when Dr. John H. Dingle, professor of preventive medicine at Western Reserve University School of Medicine spoke on "Respiratory Disease Research and Military Preventive Medicine."

The lecture will be given annually to honor the memory of the late Brigadier General James S. Simmons who retired from the Army in 1946 after 30 years service in the Medical Corps. During his Army career General Simmons was interested in the field of bacteriology and preventive medicine. During World War II he was assigned to the Office of the Surgeon General, and became chief of the Preventive Medicine Service. It was he who drew up plans for what is now called the Armed Forces Epidemiological Board.

Many honors were bestowed upon General Simmons for his outstanding work both in the service and outside military circles. In 1945 he was awarded the Distinguished Service Medal.

After leaving the Army, General Simmons became dean and professor at the Harvard School of Public Health, and he held those positions at the time of his death on July 31, 1954.

ASSIGNMENTS

Brig. General Mack M. Green who has been on duty in the Office of the Surgeon General, will assume command of the Valley Forge Army Hospital in July.

Brig. General James O. Gillespie, who has been Commanding Officer of the Letterman Army Hospital has been assigned to the Office of the Surgeon General.

RETIRED

Brig. General Rawley E. Chambers, MC, Chief of the Professional Division of the Office of the Surgeon General, retired April 30 after more than 29 years service in the Army.

General Chambers served in World War I as an enlisted man in the Field Artillery. During World War II he served in the European Theater of Operations. He returned to the United States in December 1945. After completing a tour of duty at Fitzsimons Army Hospital as Chief of the Neuropsychiatric Service he was assigned as Director of the Department of Neuropsychiatry at the Medical Field Service School, Fort Sam Houston, Texas, and was given additional duty as Chief of the Neuropsychiatric Service at Brooke Army Hospital.

General Chambers has accepted a position as Mental Director for the Texas State Hospitals and Special Schools with offices in Austin, Texas.

Colonel William Rich, DC, who was recently Theater Dental Surgeon with the United States Forces in Austria, retired from active duty on April 30. He served as an enlisted man with the 27th Division in France for a period of two years during World War I. After receiving his degree in dentistry in 1923 he was commissioned in the Army Dental Corps and has served continuously since. During World War II he was again in the European Theater. From 1947 to 1949 he served as Theater Dental Surgeon in Alaska. In 1952 he was transferred to Europe from a duty station in the United States and recently returned to this country for retirement.

Colonel George W. Hunter III, MSC, retired on March 31. He was Chief of the Parasitology Branch of the Fourth Army Area Laboratory, Fort Sam Houston, Texas. Colonel Hunter is an authority on tropical diseases and has written extensively. He is the author of four college texts, including the "Manual of Tropical Medicine." He will make his home at 109 Bryker Drive, San Antonio, Texas.

BOLIVIAN SURGEON GENERAL VISITS BAMC

Colonel Angel Barrenechea Torres, Surgeon General of the Bolivian Army, was a recent visitor at the Brooke Army Medical Center. Major General William E. Sham-

bora, the Center commander conducted Colonel Torres on an orientation tour of that large medical center, which consists of the Brooke Army Hospital, the Medical Field Service School, the Medical Training Center, and the 67th Medical Group.

NEWS ITEM FROM THE CARIBBEAN

Colonel George E. Leone, MC, Surgeon United States Army Caribbean, recently visited military medical facilities in Asunción, Paraguay, as well as Santiago and Antofagasta, Chile, and conferred with medical officers of these countries.

Brigadier General Alberto López Flores, Subdirector, Central Medical Services for the Republic of Peru, recently visited Army medical activities in the Canal Zone on his return trip from visit to the United States.

A program for the observer training of Peruvian medical officers utilizing Canal Zone Government and Army medical facilities has been established by Major General Lionel C. McGarr, Commanding General, United States Army Caribbean.

Navy

Surgeon General—REAR ADM. BARTHOLOMEW W. HOGAN

Deputy Sur. Gen.—REAR ADM. BRUCE E. BRADLEY

ANNUAL SMITH LECTURE

The Fifth Annual Harold Wellington Smith Lecture was delivered by Dr. Alan Gregg, Vice-president of the Rockefeller Foundation in April on the subject: "On the Reading of Medical Literature."

This lecture series was instituted in 1951 to commemorate the achievements of Rear Admiral Harold W. Smith, MC, a Naval medical officer who was active in the advancement of professional training and research in the Naval Medical Department.

CREDIT POINTS TO BE ALLOWED

Reserve Dental Officers may earn credit points for retirement by attending the Den-

tal-Military Seminar to be held in conjunction with the American Dental Association meeting in San Francisco, October 17-19, 1955.

The reservist must have equivalent duty orders and must attend two hours for each point; no more than three points will be awarded. The Seminar will be under the Control of the District Dental Officer, Twelfth Naval District who will report attendance to the Chief, Bureau of Medicine and Surgery, Washington, D.C.

NEWPORT NAVAL HOSPITAL COMMENDED

On March 16, 1955, the Governor of the State of Rhode Island approved a resolution of the General Assembly commending the commanding officer of the Naval Hospital, Newport, Rhode Island, Captain John L. Enyart, Medical Corps, USN, and the personnel at the Naval Hospital, Newport, "for precision action in coordinating the rescue work when an explosion at sea upon the USS Bennington proved that efficient organization is essential to life saving."

The commendation read, in part: "The personnel of the Hospital, as the result of tight and efficient organization plans, executed with precision action, coordinated rescue work with the Naval Base commands and with civilian organizations. . . . The rapid and thorough manner in which this Hospital handled the Bennington's disaster victims was an obvious demonstration of administrative excellence. . . . The Hospital is one of the finest anywhere and its public relations with communities and personalities are of real value to the Naval Service. . . ."

Eighty-two casualties from the USS Bennington disaster on May 26, 1954, were received and cared for by the Naval Hospital at Newport, Rhode Island.

NAVAL DENTAL CORPS NEWS

Personnel of the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, have developed a set of moulages for use in casualty treatment training. They provide training for casualty

treatment of head wounds, chest wounds, abdominal wounds, open and closed fractures, arterial and venous bleeding, and burns. The moulage, which has an adjustable elastic back, is fitted on a volunteer and strapped tightly to him. The vinyl resin moulage is connected by rubber tubing to a central fluid supply, which may be adjusted to create a flow of simulated blood, either arterial or venous. Any type of wound can be incorporated in the body sections provided. The moulages will respond to the casualty treatment administered. Although these training aids were developed for use on board ship, and at small shore stations, they are readily adaptable to any casualty treatment training programs.

RETIRED

Captain Ralph B. Putnam, DC; CDR. Jessie E. Crump, NC (1503 Wolfe St., Little Rock, Ark.); CDR Andrew P. Webster, MSC; LTJG Elizabeth F. Sprowles, NC.

TO RECEIVE DEGREE

Dr. Moufid Ragheb, 34-year old Egyptian physician of the Faculty of Medicine, Kasr el Aini, will receive the degree of Master of Medical Science in Gastroenterology from the Graduate School of Medicine, University of Pennsylvania, on June 15, 1955. The degree will be granted in part on the basis of postgraduate study at the University of Pennsylvania, in 1952, which was followed by two years of research conducted at U. S. Naval Medical Research Unit No. 3, Cairo, Egypt, and in Kasr el Aini Hospital.

Dr. Ragheb, whose graduate thesis dealt with diseases of the liver as seen in Egypt, is the first Egyptian physician to be granted an advanced medical degree by an American university for work conducted in Egypt.

Air Force

Surgeon General—MAJ. GEN. DAN C. OGLE
Deputy Surg. Gen.—MAJ. GEN. W. H. POWELL, JR.

AERO MEDICAL ASSOCIATION

The 27th annual meeting of the Aero Medical Association will be held at the Drake Hotel in Chicago, April 16-18, 1956. Dr. George J. Kidera, medical director of the United Air Lines, Chicago, is general chairman, and Dr. John P. Marbarger, research director, Aeromedical and Physical Environment Laboratory, University of Illinois, Chicago, is chairman of the scientific program committee.

Officers of the Association are: Dr. Kenneth E. Dowd, president; Dr. Jan H. Tillsch, president-elect; Captain Ashton Graybiel, MC, USN, first vice-president; and Dr. Thomas H. Sutherland, secretary-treasurer.

HIGH FLYER

Major Arthur Murray, USAF, has flown higher than any other human being. His record in the rocket-powered Bell X-1A has been reported unofficially as over 87,000 feet, which topped the old record of a Marine pilot in 1953.

The 36-year old Major said that the earth at the altitude at which he was flying looked like a sphere and presented startling contrasts of bright and dark areas, like a model globe made for classroom instruction. The sun overhead was incredibly brilliant. These and many other points were brought out at a recent refresher course for senior surgeons from the major air commands, held at the School of Aviation Medicine, Randolph Air Force Base, Texas.

RETIRED

Colonel James C. Barta, USAF (VC) retired on April 30. At the beginning of World War II he reported for duty with the Army Veterinary Corps at Fort Lewis. Shortly thereafter he was reassigned to the Air Corps and served throughout the war as staff veterinarian, Headquarters Second Air Force. As a civilian he became interested in veterinary public health activities and he became a pioneer in this field in the Air Force. Colonel Barta's address on retire-

ment will be P. O. Box 6014, MacDill Air Force Base, Florida.

Colonel Ernest E. Hodgson, USAF (VC), retired on March 31. After graduating from the Kansas State College in 1924 he entered the Army Veterinary Corps. During World War II he was assigned to the Army Air Corps until his assignment to the South Pacific as theater veterinarian. In 1949 he transferred to the Air Force and was assigned as staff veterinarian at Headquarters 15th Air Force, March Air Force Base, California, the assignment he held until his retirement. He will make his home at 2405 Rancho Drive, Riverside, California.

Public Health Service

Surgeon General—LEONARD A. SCHEELE, M.D.

Deputy Surg. Gen.—W. PALMER DEERING, M.D.

CONSULTANT TO WORLD HEALTH ORGANIZATION

Dr. James Lieberman, veterinarian with the U. S. Public Health Service's Communicable Disease Center, Atlanta, Georgia, will return this month from a two-month assignment as Veterinary Public Health Consultant to the European Regional office of the

World Health Organization, Geneva, Switzerland.

He was concerned on his assignment in the development of veterinary public health in European countries, the three current veterinary public health problems of European countries (rabies, brucellosis, and bovine tuberculosis), and the revision of the Zoonoses list of the World Health Organization.

UNFIT FOODS AND DRUGS

There were 85 shipments of foods and drugs seized in March in alleged violation of the Federal Food, Drug, Cosmetic and Caustic Poison Acts, according to the monthly report of the Food and Drug Administration.

The seizures included 233 tons of unfit food, such as shelled peanuts and flour contaminated by rodents and insects, decomposed fish and shellfish, etc. The confiscated drugs were mislabeled or otherwise misleading to the prospective buyers.

LABORATORY REFRESHER TRAINING COURSES

The following Laboratory Refresher Training courses will be offered at the Communicable Disease Center, Public Health Service, Chamblee, Georgia. For further information and application forms address the Center at P.O. Box 185, Chamblee, Georgia.

SCHEDULE

JULY 1955-JUNE 1956

Dates	Course No.	Courses	Duration
Sept. 12-23	8.40	Laboratory Diagnosis of Bacterial Diseases Part 1. General Bacteriology	2 wks.
Sept. 12 to Oct. 7	8.00	Laboratory Diagnosis of Parasitic Diseases Part 1. Intestinal Parasites	4 wks.
Sept. 26 to Oct. 7	8.41	Laboratory Diagnosis of Bacterial Diseases Part 2. General Bacteriology	2 wks.
Oct. 10-28	8.01	Laboratory Diagnosis of Parasitic Diseases Part 2. Blood Parasites	3 wks.
Oct. 17-28	8.20	Laboratory Diagnosis of Viral and Rickettsial Diseases	2 wks.
Oct. 17-28	8.50	Laboratory Diagnosis of Bacterial Diseases Enteric Bacteriology	2 wks.
Oct. 31 to Nov. 4	8.26	Laboratory Diagnosis of Rabies	1 wk.
Oct. 31 to Nov. 11	8.15	Laboratory Methods in Medical Mycology Part 1. Cutaneous Pathogenic Fungi	2 wks.

Nov. 14-25	8.16	Laboratory Methods in Medical Mycology Part 2. Subcutaneous and Systemic Fungi*	2 wks.
Nov. 14-25	8.55	Laboratory Diagnosis of Tuberculosis	2 wks.
Nov. 28 to Dec. 9	8.17	Laboratory Methods in the Study of Pulmonary Mycoses	2 wks.
Dec. 12-16	9.40	Laboratory Diagnostic Methods in Veterinary Mycology	1 wk.
Mar. 12-23	8.20	Laboratory Diagnosis of Viral and Rickettsial Diseases	2 wks.
Mar. 26-30	8.26	Laboratory Diagnosis of Rabies	1 wk.
	8.05	Laboratory Diagnosis of Malaria**	2 wks.
	8.21	Virus Isolation and Identification Techniques**	2-4 wks.
	8.42	Typing of <i>Corynebacterium diphtheriae</i> **	1 wk.
	8.51	Special Problems in Enteric Bacteriology**	2 wks.
	8.52	Phage Typing of <i>Salmonella typhosa</i> **	1 wk.

* Completion of Course 8.15 or equivalent education or experience is a prerequisite.

** Courses offered by special arrangement only.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.

Deputy Chief Med. Dir.—R. A. WOLFORD, M.D.

1954 ANNUAL REPORT OF THE VETERANS ADMINISTRATION

Should you desire the complete report of the Veterans Administration it is on sale at the Government Printing Office. Simply address the Superintendent of Documents at that office, Washington 25, D.C. and enclose \$1.00 (no stamps or personal checks).

But here are a few highlights from that report. On June 30, 1954 the Veterans Administration was paying disability compensation or pension to more than 2.5 million veterans. There was provided nearly 40 million patient days of care, more than half of which was for the mental illnesses, to 580,200 veterans in Veterans Administration and non-VA hospitals for that fiscal year. Approximately 1,511,000 veteran visitors received outpatient medical treatment in Veterans Administration clinics or from hometown physicians. Such care is limited almost entirely to veterans for service-connected disabilities. During the fiscal year 1954 an average of 506,000 veterans trained each month in schools, on-the-job, or on-the-farm under the two GI Bills.

The report is full of other facts which show that the United States takes care of its

veterans better than any other country in the world. Incidentally the budget for next year for the Veterans Administration is almost 4.5 billion dollars.

VA TRAINING

Veterans' enrollment under the three-year-old Korean GI Bill training program reached an all-time high of 587,000 in April. This was about 10 percent above the previous record of December 1954, and nearly double the figure of a year ago. College enrollments rose to 325,000 on April 1 after a slight winter slump. The number of GI students in schools below the college level shot up to a new high of 178,000. Job training reached a record of 55,000. The GI veteran farm training was 29,000.

ASSIGNMENTS

Donald Cowley has been appointed manager of the Veterans Administration hospital in Boise, Idaho. He succeeds James M. Carr, who resigned as manager of that hospital in April.

Dr. Hursel C. Manaugh, chief medical officer of the Veterans Administration Center in Bay Pines, Florida, has been appointed manager of the Veterans Administration hospital in Fayetteville, Arkansas.

Harry R. Pool, manager of the Veterans Administration Center in Fargo, N.D., has been appointed manager of the large Veterans Administration Hospital at Hines, Ill. Mr. Pool, an attorney, has been with the

Veterans Administration since 1921, and has served in many positions of legal and administrative nature.

Miscellaneous

NATIONAL HEALTH FORUM

The 1955 National Health Forum was recently held in New York. The Forum is the annual meeting place for those interested in health betterment of the nation. Representatives of 50 national agencies composing the National Health Council, were present. The new president is Hugh R. Leavell, M.D., professor and head of the Department of Public Health Practice, Harvard School of Public Health.

Ellsworth Bunker, president of the American National Red Cross, listed the "areas ripe for concerted action": (1) desperate shortages in health personnel, (2) "the appalling rise in the numbers of the recognized mentally ill," (3) help for the crippled, emotionally disturbed, or retarded child, (4) services for the aged, (5) preparation to meet a national emergency, (6) "completing the nationwide pattern" of state and local health councils.

Dr. Dexter M. Keezer, vice-president and director of the Department of Economics of the McGraw-Hill Publishing Company, made "studious guesses" that by 1965 we shall be living in (1) a very dangerous world under heavily armed truce, (2) a more crowded country, with 190,000,000 population, (3) a nation more heavily, but not dangerously, weighted to the extremes of youth and old age, (4) a woman's world, in terms of numbers, (5) a restless society in terms of movement from place to place, (6) a fast moving economy, generating a high degree of industrial and occupational obsolescence, (7) a rich country with the wealth widely distributed.

SEASON OF FOOD INFECTION AND POISONING

With the approaching warm season a caution about foods and left-overs is proper. A recent issue of the Weekly Report on com-

municable diseases of the Public Health Service, mentioned several cases of food infection and poisoning which occurred in private households.

Two suspect cases of botulism, one of them fatal, developed in Philadelphia from home-canned wild mushrooms. In California, a group of persons suffered from diarrhea in outbreaks of Salmonella infection which could be traced to reheated turkey dinners. In another household a reheated dish of liver, rice, and gravy resulted in gastroenteritis caused by contamination with staphylococci.

Those picnic lunches made for the day's outing should be carefully prepared, particularly as to meat products.

SMOG

Los Angeles is determined to do something about its smog. So two agencies are studying the problem in order to clear away the smoke. One, the Country Air Pollution Control District, and the other, privately-supported Air Pollution Foundation, will surely bring forth some valuable information for not only Los Angeles but other cities where smog endangers lives not only from a health viewpoint but from the risks involved in traffic. We are told that the two agencies in Los Angeles are not in conflict but will work jointly on the smog problem in that area.

THE HEBREW MEDICAL JOURNAL

This semiannual medical journal has its original articles in Hebrew in the back half of an issue while an English section in the front half gives translations and/or summaries of the published papers. The year 1954, when the journal has reached its 27th year of publication, happened to be the 750th anniversary of the death of *Moses ben Maimon* (or *Maimonides*), famous medieval physician and philosopher. Hence, in addition to the customary clinical studies in the Medical Section, the second volume of the journal, which we have before us, also contains interesting articles on the life and

activities of Maimonides (Dr. M. Einhorn), his medical work and its relation to his philosophical and religious ideas (Dr. J. Rabin), his fight against occultism (Dr. L. Nemoy), his views on Galenos (Dr. Z. Muntner), and his influence upon other medieval writers (Dr. D. Margolith).

For the medical historian, the article on the bibliographical list of Galenian works (p. 120-133), included by Maimonides in his *Pirke Moshe*, is the most important among the papers in this Hebrew journal. Eighty-seven of the Galenian works were known to Maimonides, mostly in Arabic translation. Several of the works are now lost to the modern man of science. The names of the works are cited by their Arabic, Hebrew, Latin and Greek titles.

Among other articles found in the volume, a paper written by the Chief Rabbi of Ireland is significant because it discusses the Jewish legal views (in the *Sulchan Aruch*) on sterilization and eugenics, in comparison with the historical and contemporary views of Christianity in general and of the Roman Catholic Church in particular. The volume, also other previous issues of the journal that we have seen, reflect the scholarship customarily manifested in rabbinical writings.

RESEARCH INSTITUTE

Several years ago, in 1945, Dr. Johan Bjorksten, who came to this country from Finland, established his own research laboratories with the purpose of discovering the biochemistry of aging and for applying this knowledge for longer and more healthful life. To his original establishment was later added a non-profit making organization, the Bjorksten Research Foundation. It initiated studies on a number of biomedical subjects related to the problem of aging and to the working hypothesis that aging may follow the immobilization of tissue proteins such as would occur as the result of irreversible cross-linkages. The Foundation, and its Life Prolongation Research Institute are located in Madison, Wisconsin. It oper-

ates with a yearly income of approximately \$28,000, collected chiefly from donations.

MEDICAL STUDENTS WIN AWARDS

The Schering Award Winners in the 1954 competition among medical students were: Billing F. Andrews (Duke), first prize—\$500; Richard E. Land (Northwestern) first prize—\$500; Marvin J. Friedenberg (Tufts), first prize—\$500; George A. Wilson (Ohio State), second prize—\$250; Elbert W. Phillips and Robert J. E. Zech-nich (State University of New York-Syracuse), second prize—\$250; Alvin Lashinsky (New York), second prize—\$250. Prizes are awarded in three different fields.

MEDICAL STUDENTS' AWARDS

The tenth annual Schering Award competition for medical students has opened. Titles of three subjects on which American and Canadian students are invited to submit papers this year are: Current Concepts in the Management of Osteoporosis; Prevention and Treatment of Blood Transfusion Reactions; and Recent Trends in the Clinical Use of Adrenocortical Steroids.

Both a \$500 first prize and a second one of \$250 will be awarded for each of the three subjects. Special recognition in the form of a professional gift will be given each student submitting a meritorious paper.

Deadline for entry forms specifying the choice of title is July 1. Manuscripts should be mailed not later than October 1. Students may compete individually or cooperatively in teams.

Information and instruction for the award competition are available from the Schering Award Committee, 60 Orange St., Bloomfield, N.J.

MOTION PICTURE FILMS

A completely revised Fourth Edition of *Professional Films* is now in compilation. This is a medical and dental film catalogue published by Academy-International of Medicine. The catalogue will include new sections providing biographical data on

authors, and information on audio-visual activities of medical schools, dental schools, and postgraduate teaching centers. Insert pages to the catalogue are planned for the additional listings as they become available.

Film authors are urged to have their films listed. Further information can be obtained by writing the Secretary, 601 Louisiana Street, Lawrence, Kansas.

NEW ANTIBIOTIC

Two different pharmaceutical companies, working independently, have succeeded in isolating a new antibiotic from cultures of *Streptomyces garyphalus*. The new substance is of wide range of usefulness, according to claims, especially in urinary infections of certain types, and in pulmonary tuberculosis. The new substance is chemically D-4- amino-isoxazolidone, and has been introduced under the tradenames, *cycloserine* and *oxamycin*.

Honor Roll

Since publication of our last list, the following sent in one or more applications

for membership in the Association:

Lt. Col. B. Aabel, MSC, USA
 Dr. Bernard Abel
 Sr. Surg. John J. Andujar, USPHS (R)
 Med. Dir. Chapin Binford, USPHS
 Major Norman I. Condit, USAF (MC)
 Med. Dir. John C. Cronin, USPHS
 I. Hanenson, M.D.
 Samuel Lieberman, M.D.
 Capt. H. Easton McMahon, MC, USNR
 Capt. Bobby H. McVicker, USA
 Maj. Gen. Joseph I. Martin, MC, USA
 Lt. Cdr. Edward L. Merritt, MC, USNR,
 Ret.
 Marvin T. Meyer, M.D.
 F. K. Mostofi, M.D.
 Col. Walter L. Peterson, MC, USA
 Major Jack P. Pollock, DC, USA
 Lt. J. H. Schulte, MC, USN
 Lt. Col. Max L. Smith, MC, USA
 Med. Dir. Ralph B. Snavely, USPHS
 Lt. Col. C. E. Stevens.
 Col. Arthur L. Streeter, USAF (MC)
 Col. Yung-Chin Tai, MC, Chinese AF
 Maj. Gen. T. Upanthambhananda, MC,
 RTAF



LATE NEWS

The Director of the Armed Forces Institute of Pathology, Brig. General Elbert DeCoursey, has announced the appointment of Dr. Ernest W. Goodpasture, Professor of Pathology and former Acting Dean of the School of Medicine, Vanderbilt University, to the position of Scientific Director of the newly activated Department of Pathology of the Institute. He will take the position July 1. This recently created position was recommended by the Scientific Advisory Board of the Institute. Three other major departments of the Institute are: the American Registry of Pathology, the Medical Illustration Service, and the Medical Museum.

Dr. Goodpasture is one of the leading pathologists in the United States. In 1946 he was the recipient of the Passano Foundation Award for the advancement of medical research. He was the first person to use the chick embryo for growing viruses; through this means the yellow fever vaccine was produced.

As head of this newly created department Dr. Goodpasture will be responsible for the supervision and correlation of the professional functions of the Department, which comprise the divisions of Consultative Pathology, Dynamic Pathology and Basic Science Laboratories.

O B I T U A R I E S

Col. George A. Stewart, U. S. Army, Reserve, Ret.

George A. Stewart, Colonel, U. S. Army, Reserve, retired, died at Baltimore, Maryland on April 23 at the age of 70 years.

Colonel Stewart was a native of Pennsylvania. He received his medical degree from Johns Hopkins School of Medicine in 1911, and until 1914 was with the St. Agnes Hospital, at Baltimore in the positions of interne and resident. His specialty was in the field of surgery, and he served on the staff of Johns Hopkins School of Medicine for a number of years. In 1945 he became Asst. Professor of Surgery at that School and in 1950 was designated as Asst. Professor Emeritus of Surgery.

He was president of the American Association for the Study of Neoplastic Diseases, 1936-1937; a member of the Founders Group: American Board of Surgery, American Board of Thoracic Surgery, and the Maryland Association of Industrial Physicians and Surgeons.

During World War I he served in the grades from lieutenant to lieutenant colonel, and in World War II served from 1941 to 1946 in the grades of lieutenant colonel and colonel. In 1948 he retired from the Medical Reserve Corps of the Army.

During World War I he was awarded a decoration by the French government for War Service "Ministère de l'Intérieur, Assistance Publique"; in World War II the Army awarded him the Commendation Ribbon.

Colonel Stewart was a Fellow of the American College of Surgeons, a Fellow of the American Medical Association, and a member of the American Association for Thoracic Surgery, Society of U. S. Medical Consultants in World War II, New York Academy of Science, and the Association of Military Surgeons.

His home address was 5300 St. Alban's Way, Baltimore, Md.

Capt. Wilbert J. Schneider, U.S. Navy, Ret.

Wilbert John Schneider, U. S. Navy, Retired, died April 13 in the Naval Hospital, San Diego, California at the age of 54.

Captain Schneider was born July 9, 1900 in Hamilton, Ohio. He received his degree of Doctor of Dental Surgery from the Ohio College of Dental Surgery in 1923. Following 17 years of private practice in Hamilton, Ohio, he was called to active duty as a Lieutenant Commander in the Dental Corps, U. S. Naval Reserve in 1940, and transferred to the Regular Navy in 1946. He was retired for physical disability December 1, 1953. Captain Schneider is survived by his wife, Mrs. Lucille H. Schneider, 4439 Via Pinzon Estates, Palos Verdes, California.

Lt. Comdr. Thomas J. Murphy, U.S. Navy, Ret.

Thomas Joseph Murphy, Lt. Commander, USN, Retired, died April 15 in the Naval Hospital, Newport, Rhode Island. He was 69 years old.

Commander Murphy was a native of Philadelphia. While a student at Villanova (Pennsylvania) College in 1908 he enlisted in the Navy. In 1918 he was promoted to the temporary grade of lieutenant, and in 1921 was permanently commissioned Chief Pharmacist. In 1944 he was promoted to the grade of lieutenant commander, and was retired on November 1, 1945.

Commander Murphy is survived by his wife, Mrs. Dorothy B. Murphy, 33 Slocum, Newport, Rhode Island.

B O O K R E V I E W S

UROLOGY. By Meredith Campbell, M.S., M.D., F.A.C.S., Emeritus Professor of Urology, New York University. With the collaboration of fifty-one contributing authorities. 3 volumes. 2351 pages. 1148 figures. W. B. Saunders Co., Philadelphia. 1954. Price \$60.00.

Several years in preparation, this long-awaited three-volume text is the answer to the need for a complete work in Urology. The editor has assembled a list of 51 contributing authorities, American and foreign, that reads like a Who's Who in Urology. Many of their contributions are classic monographs.

Volume I is devoted primarily to the basic sciences of Urology. The anatomy, physiology, and embryology of the urogenital tract are adequately described. An outstanding section is that on the embryology and anomalies of the urogenital tract by the editor, this being largely extracted, condensed and revised from his clinical textbook, "Clinical Pediatric Urology" published in 1951. Sections on the Principles of Diagnosis, Pathology of Urinary Obstruction, Infections and Inflammations of the Urinary and Genital Tracts, Urinary Lithiasis and Foreign Bodies, and Infertility in the Male, are included.

Volume II contains sections on injuries, tumors, and neuromuscular disease of the urogenital tract. Also contained are sections on Urology in the Female, and Urology in Infancy and Childhood.

Volume III is devoted largely to well-illustrated descriptions of the more common urological surgical operations. It also contains sections on Endocrinology, Radiation Treatment of Genito-Urinary Tumors, Medical Diseases of the Kidneys, and The Adrenals.

Sections of outstanding interest are those prepared by such well-known urologists as Narath, Higgins, Deming, William W. Scott, Jewett, Dean, Emmett, Campbell, Engle, Nesbit, and Harrison in the fields in which they are recognized authorities. The material is well organized. The basic sciences in their application to Urology are clearly presented. The newer diagnostic procedures, such as presacral pneumonography and aortography,

are fully described. Concepts of adrenal function, their aberration in lesions of the glands, and the chemistry of steroids are brought up-to-date. The various methods of prostatectomy are presented by their foremost advocates. In all controversial points, such as the treatment of carcinoma of the prostate and carcinoma of the bladder, the arguments are fairly evaluated.

The books are amply illustrated, there being 1148 figures. A very complete bibliography is appended to each chapter and the volumes are well indexed. For years to come, this text will be recognized as a foremost reference in Urology.

COL. JACK W. SCHWARTZ, MC, USA.

CORRELATIVE NEUROSURGERY. By Edgar A. Kahn, M.D., Professor of Surgery, University of Michigan Medical School; Robert C. Bassett, M.D., Associate Professor of Surgery, University of Michigan Medical School; Richard C. Schneider, M.D., Associate Professor of Surgery, University of Michigan Medical School; and Elizabeth Caroline Crosby, Ph.D., Professor of Anatomy, University of Michigan Medical School. 413 pages, illustrated. Charles C Thomas, Springfield, Illinois, 1955. Price \$19.50.

This book reflects the neurosurgical experience over many years of an always active and always practical neurosurgical service. The principles and methods described in this book reflect very strongly the former practices of the old chief at Michigan, Dr. Max Minor Peet.

In this large, actually atlas size, book the authors have attempted to correlate neurosurgical diagnosis and technique with such matters as electroencephalographic localization, roentgenologic examination, the use of radio-active isotopes in diagnosis and localization of lesions of the nervous system, certain of the concepts in the broad spectrum of aphasia and certain specific anatomic interests to the neurosurgeon.

There are obviously many other matters of anatomy, physiology, medical neurology and investigative methods which could have been explored by the authors in their attempt at "correlation." No doubt they felt limited

in what in all these broad fields they could choose for the specific uses of this book. There is a good chapter on the plastic repair of scalp defects, some very practical remarks on the surgical treatment of pain (the authors are not strong supporters of prefrontal lobotomy for pain), and the section on electroencephalography is particularly good.

The book is beautifully illustrated and the publisher and printer have turned out a beautiful volume. It is a direct approach to the basic principles of neurosurgery and will undoubtedly find favor in the hands of many young neurosurgeons.

COL. JOHN MARTIN, MC, USA

CROWN AND BRIDGE PROSTHESIS. 3rd ed. By Stanley D. Tylman, A.B., D.D.S., M.S., F.A.C.D., Professor of Prosthetics, Head of the Dep't of Fixed Partial Dentures, University of Illinois, College of Dentistry, Chicago, Ill. 1016 pages, 1364 illustrations with 9 color plates. C. V. Mosby Co., St. Louis, 1954. Price \$16.00.

In this 3rd edition, the author has contributed to his profession a great work containing new and accepted developments in the field of fixed partial dentures.

Throughout this book, Dr. Tylman emphasizes the necessity for thorough and complete treatment planning of the oral structures with proper consideration and correlation of the varied and accepted techniques with those biological principles, so that the functions, esthetic appearance, and comfort of the patient are adequately restored. Much thought is given to the selection of mechanical design as a prophylactic measure in the prevention of the pathological processes as well as the restoration of impaired or lost biological functions.

Certainly this text is most comprehensive in scope, but also contains significant points in adequate detail to be valuable as a quick reference. Without doubt, it will prove to be of infinite value to the dental student, internist or to the general practitioner who might well consider this reference text as useful and necessary to the success of his practice.

COL. JACK M. MESSNER, USAF (DC)

OPERATIVE ORTHOPEDIC CLINICS. By Lewis Cozen, M.D., F.A.C.S., Ass't Prof. of Orthopedic Surgery, College of Medical Evangelists, Los Angeles, Calif., and Alvia Brockway, M.D., Chief of Staff, Orthopedic Hospital, Los Angeles, Calif. 329 pages, 310 illustrations. J. B. Lippincott

Co., Philadelphia and Montreal, 1955. Price \$10.00.

This is a compilation of 226 orthopedic procedures encompassing a multitude of various orthopedic diseases and injuries. The cases range from relatively simple procedures such as the aspiration of a joint to complex problems associated with poliomyelitis and cerebral palsy. The cases are grouped in chapters on an anatomical basis, except for the final chapter, which is on fractures of the extremities. Each case presented gives the age of the patient, the gross findings, and the procedure performed, as taken from the dictated report of the operating surgeon. Following each procedure or group of similar procedures, there are remarks by the authors enlarging on the particular case. These remarks are terse and pertinent and display complete honesty and candor, pointing out errors committed as well as the virtues of a given procedure. There are 310 illustrations, all of which are line drawings which are sharp and clear. At the end of each chapter there is an extensive bibliography. There are 12 pages of illustrations of orthopedic instruments at the end of the book which should be helpful to interns and residents. The book is well indexed.

Critical review of this book should point out certain shortcomings. One such defect is noted by the authors in their Preface, when they say: "Had the operative reports been dictated more carefully, a more lucid picture of the operation would be present in many instances." The "Gross Findings" in some instances depict clinical findings, and in others, the anatomical findings at surgery. It is not always easy to visualize the situation confronting the surgeon in the absence of a descriptive diagram or radiograph in many of the cases. This is particularly true of the section on fractures where accurate depiction of a fracture frequently defies verbal description. Since the cases presented in this book obviously had to be reviewed in preparation for this publication, it is regrettable that some end results were not presented.

In the Preface, the authors state: "An attempt has been made figuratively to allow the reader to take his place in the operating room of two busy orthopedic services. After the dictated report of the operating surgeons, the reader will find some remarks similar to the verbal comment the surgeon might make during and after the actual surgery." The authors have commendably accomplished this objective.

MAJ. ROBERT W. PARVIN, MC, USA

NEW BOOKS

- Two Years in the Antarctic*, by E. W. Kevin Walton, Philosophical Library, New York, N.Y. Price \$4.75.
- Pomp and Pestilence. Infectious Disease, its Origins and Conquest*, by Ronald Hare, M.D. Philosophical Library, Inc., New York, N.Y. Price \$5.75.
- Medical Care of Aged and Chronically Ill*, by Freddy Homburger, M.D. Little, Brown & Co., 34 Beacon St., Boston, Mass. Price \$6.50.
- An Atlas of Surgical Exposures of the Extremities*, by Sam W. Banks, M.D. and Harold Laufman, M.D. W. B. Saunders Co., Philadelphia, Pa. Price \$15.00.
- Flight Handbook*, edited by Maurice A. Smith, D.F.C., 5th ed. Philosophical Library, Inc., New York, N.Y. Price \$6.00.
- Demonstrations of Physical Signs in Clinical Surgery*, by Hamilton Bailey, F.R.C.S. (Eng.), F.A.C.S., F.R.S.E., 12th ed. The Williams & Wilkins Co., 1954, Baltimore, Md. Price \$8.00.
- Realistic Combat Training*, by Lt. Col. Robert B. Riggs, U. S. Army. The Military Service Publishing Co., Harrisburg, Pa. Price: \$3.50 cloth bound; \$2.75 paper bound.
- Medical Progress, A Review of Medical Advances during 1954*, Morris Fishbein, M.D., Editor. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, Toronto and London.
- Cecil and Loeb—Textbook of Medicine*, 9th Ed. by 169 Americans. W. B. Saunders Co., Philadelphia, Pa.
- Weltraumstrahlung*, by Jakob Eugster. Verlag Hans Huber, Bern and Stuttgart. Fr. 26. Intercontinental Medical Book Corp., New York, N.Y.
- Differential Diagnosis of Internal Diseases*, 2d ed., by Julius Bauer, Grune & Stratton, Inc., New York, N.Y. Price \$15.00.
- Physician's Handbook*, 8th ed. revised, by Krupp, Sweet, Jawetz and Armstrong. Physicians' Record Co., Chicago 5, Ill. Price \$2.50.
- Management of Addictions*, edited by Edward Podolsky, M.D. Philosophical Library, New York, N.Y. Price \$7.50.
- Foetal, Infant and Early Childhood Mortality*, Vol. I The Statistics, Price \$1.50; Vol. II Biological, Social and Economic Factors, Price \$.40. Columbia University Press, New York, N.Y.
- Practical Endocrinology*, by Lewis M. Hurxthal, M.D. The Blakiston Division of the McGraw-Hill Book Co., New York, N.Y. Price \$7.00.
- The Chemistry of Micro-Organisms*, by Arthur Bracken, B.Sc., Ph.D. Pitman Publishing Corp., New York, N.Y. Price \$6.00.
- Antimicrobial Therapy in Medical Practice*, by Harrison F. Flippin, M.D. and George M. Eisenberg, D.Sc. F. A. Davis Co., Philadelphia, Pa. Price \$5.00.
- Standard Methods for the Examination of Water, Sewage, and Industrial Wastes*, Tenth Ed. American Public Health Association, New York, N.Y. Price \$7.50.
- Experiencing the Patient's Day, A Manual for Psychiatric Hospital Personnel*, by Robert W. Hyde, M.D. G. P. Putnam's Sons, New York, N.Y. Price \$2.20.
- Bickham-Callander Surgery of the Alimentary Tract, Vols. I, II & III* By Richard T. Shackelford, M.D. and Hammond J. Dugan, M.D. W. B. Saunders Co., Philadelphia, Pa. Price \$60.00 per set.

Any of the above books may be ordered through the Association of Military Surgeons. Check book desired and return this page

The Sir Henry Wellcome Medal and Prize

COMPETITION FOR 1955

THE competition is open to all medical department officers, former such officers, of the Army, Navy, Air Force, Public Health Service, Veterans Administration, The National Guard and the Reserves of the United States, commissioned officers of foreign military services, and all members of the Association, except that no person shall be eligible for a second award of this medal and prize and no paper previously published will be accepted.

The award for 1955, a medal, a scroll, and a cash prize of \$500, will be given for the paper selected by a committee composed of the Association's vice-presidents which reports on the most useful original investigation in the field of military medicine. The widest latitude is given this competition, so that it may be open to all components of the membership of the Association. Appropriate subjects may be found in the theory and practice of medicine, dentistry, veterinary medicine, nursing and sanitation. The material presented may be the result of laboratory work or of field experience. Certain weight will be given to the amount and quality of the original work involved, but relative value to military medicine as a whole will be the determining factor.

Each competitor must furnish six copies of his paper which must not be signed with the true name of the author, but are to be identified by a *nom de plume* or distinctive device. These must be forwarded to the Secretary of the Association of Military Surgeons of the United States, Suite 718, 1726 Eye St. N.W., Washington 6, D.C., so as to arrive at a date not later than 1 August 1955, and must be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and enclosing his true name, title and address. The length of the essays is fixed between a maximum of 10,000 words and a minimum of 3000 words. After the winning paper has been selected the envelope accompanying the winning essay or report will be opened by the Secretary of the Association and the name of the successful contestant announced by him. The winning essay or report becomes the property of the Association, and will be published in *MILITARY MEDICINE*. Should the Board of Award see fit to designate any paper for "first honorable mention" the Executive Council may award the writer life membership in The Association of Military Surgeons, and his essay will then also become the property of the Association.

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LAUE
LAY
LETO
McFA
MAY
MEEH
(MC
MILB
USA

CONTRIBUTORS

ABDELLAH, FAYE G., R.N., USPHS
 ANDERSON, K. LANGE, M.D.
 ARMSTRONG, GEORGE E., MAJOR GEN.
 MC, USA
 BEDWELL, THEODORE C., JR., COL. USAF
 (MC)
 BOONE, J. T., VICE ADM., MC, USN, RET.
 BOWERS, WARNER F., COL. MC, USA
 BROWNTON, SHELDON S., COL. USAF
 (MC)
 BUNN, RALPH W., LT. COL. MSC, USA
 CALKIN, WILLARD C., CAPT. MSC, USN
 CLAUSSEN, ESTHER, MAJOR ANC
 COOK, EDGAR L., MAJOR MC, USA
 DAYKIN, SAMUEL P., LT. COL. USAF
 (MSC)
 DEAN, JOSEPH O., M.D.
 DINGLE, JOHN H., M.D.
 DIRKSEN, LYNN C., COL. DC, USA
 ELLIS, F. P. SURG. CDR., ROYAL NAVY
 ENYART, JOHN L., CAPT. MC, USN
 FLEETWOOD, PHILLIP G., COL. USAF
 (MSC)
 FRENCH, FRANK S., M.D.
 GILLIAM, ALEXANDER G., M.D.
 HAAS, VICTOR H., M.D.
 HELLER, JOHN R., M.D.
 HIMMELSBACH, C. K., M.D.
 KNIGHT, KENNETH L., CDR. MSC, USN
 KORSON, SELIG M., M.D.
 LACASSE, WALTER J., LT. COL. USAF
 (MSC)
 LAUBUSCH, EDMUND J., B.S., S.M.
 LAY, FRANCES, LT. COL. USAF (NC)
 LETOURNEAU, CHARLES, M.D.
 McFARLAND, ROSS A., PH.D. SC.D.
 MAYER, CLAUDIUS F., M.D.
 MEEHAN, JOHN P., JR., CAPT. USAFR
 (MC)
 MILBURN, BRYAN L., MAJOR GEN. GS,
 USA
 MILLER, LLOYD C., PH.D.
 MITCHELL, ROLAND B., MAJOR USAFR
 (MSC)
 MOSELEY, H. G., COL. USAF (MC)
 MULDOON, HUGH C., D.S.C.
 NGUYEN-HUM, PROF.
 NIELSEN, ARNE G., CDR. DC, USN
 ODLAND, LAWRENCE T., CAPT. USAF
 (MC)
 OGLE, DAN C., MAJOR GEN. USAF (MC)
 PELTON, WALTER J., D.D.S.
 PETERSON, PAUL, CAPT. MC, USN
 PHAN-HA-THANH, LT. MC, VIETNAM
 ARMY
 PIXLEY, CHARLES F., MAJOR MC, USA
 PUGH, H. L., REAR ADM. MC, USN
 RIBBLE, G. B., CAPT. MC, USN
 SABIN, ALBERT B., M.D.
 SCHEAR, EVAN W., MAJOR USAF (MC)
 SCHEELE, LEONARD A., SURG. GEN.
 USPHS
 SCIGLIANO, JOHN H., PH.D.
 SEAL, JOHN R., CDR. MC, USN
 SHAW, CHRISTOPHER C., CAPT. MC, USN
 SHAW, JAMES R., M.D.
 SLOAN, LOUISE I., PH.D.
 SNYDER, JOHN C., M.D.
 STEWART, NEWELL
 SULLIVAN, BENJAMIN H., JR. LT. COL.
 MC, USA
 THOMPSON, VERA E., LT. NC, USN
 TOMSOVIC, EDWARD J., MAJOR MC, USA
 TRUM, BERNARD F., LT. COL. VC, USA
 VUONG-QUANG-TRUONG, MAJOR MC,
 VIETNAM ARMY
 WILLARD, JOHN H., CAPT. MC, USNR
 WOLFE, KATHRYN B.
 YOUNG, WESLEY O., D.M.D.
 ZANCA, PETER, COL. MC, USA
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